Detrex Corporation
P.O. Box 5111
Southfield, Michigan 48086-5111

DETREX CORPORATION

EATON AVENUE FACILITY

DETROIT, MICHIGAN

Testing Engineers & Consultants, Inc.
P.O. Box 249
1333 Rochester Road
Troy, Michigan 48083-6015
(313) 588-6200 or Dial (313) T-E-S-T-I-N-G

08 October 1992

Testing Engineers & Consultants, Inc.

1333 Rochester Road • P.O. Box 249 • Troy, Michigan 48099-0249
313-588-6200 or Dial 313-T-E-S-T-I-N-G
Fax 313-588-6232

TEC Workplan Number: 25714
Date Issued: 08 October 1992

Detrex Corporation
P.O. Box 5111
Southfield, Michigan 48086-5111

Attention: Mr. Bill Moore

Re: Detrex Corporation;
Eaton Avenue Facility,
Detroit, Michigan

Dear Mr. Moore:

In response to the Detrex permit conditions (MID 091 605 972), enclosed are the workplans and reports required to be submitted within 90 days of the issuance of the permit.

We are pleased to provide this service. Should you have any questions or desire further information, please do not hesitate to contact this office at your earliest convenience.

Respectfully submitted,

TESTING ENGINEERS & CONSULTANTS, INC.

Frederick G. Roeser
Project Hydrogeologist

Robert J. Nowakowski
Manager, Environmental Assessments

Gerald M. Belian, P.E.
Executive Vice President

FGR/RJN/GMB/dz
Enclosures

TABLE OF CONTENTS

DESCRIPTION OF CURRENT CONDITIONS

DETREX CORPORATION
MID 091 605 972

TASK I

Testing Engineers & Consultants, Inc.
P.O. Box 249
1333 Rochester Road
Troy, Michigan 48083-6015
(313) 588-6200 or Dial (313) T-E-S-T-I-N-G

08 October 1992

TABLE OF CONTENTS

DESCRIPTION OF CURRENT CONDITIONS

TASK I

1.0 FACILITY BACKGROUND

This portion will summarize the regional location, pertinent boundary features, general facility physiography, hydrogeology, and historical use of the facility for the treatment, storage, or disposal of solid and hazardous waste.

1.1 Topographic Maps

The Detrex facility is located at 12886 Eaton Avenue in the City of Detroit, Michigan. The geographic location for this site is latitude 42° 23′ 5′′ and longitude 83° 10′ 22′′. A Site Location Map, indicating the location of the site as taken from the USGS Topographic Map, Royal Oak Quadrangle (1968, photo revised 1981), is presented in Attachment 1. The location of the site on the USGS map is T01S, R11E, in the SE 1/4 of the NW 1/4 of Section 20.

The topography of the site is generally level, with a maximum difference of 2.5 feet in elevation from the highest point to the lowest point on the site. A map detailing the site topography and surface drainage is presented in Attachment 2. The surface water runoff is directed away from the buildings, with the exception an area along the east wall. The water at this point is collected in a sump and is tested to insure proper disposal, if needed. There are no wetland areas on or in the vicinity of the site.

.....continued

1.2 Land Use

The property is bordered to the north and west by a railroad easement; to the south by Eaton Avenue; and to the east by the Detroit Non-Ferrous Foundry, Inc. The zoning for the subject property and the property to the east is M-4, Intensive Industrial. The remaining areas are zoned R-1, Residential.

1.3 Legal Boundaries

A copy of the most recent legal survey of the property owned by the Detrex Corporation, along with the legal description, is provided in Attachment 3. The survey map shows all buildings, utilities, paved areas, easements, and right-of-ways.

1.4 Flood Control

A Flood Insurance Rate Map (FIRM), dated 02 July 1981, was reviewed for any floodplains that may be located on or near the facility. No 100 year floodplains are located in the area of this facility; in fact, the closest one is located approximately 4.5 miles west (Rouge River). The loading/unloading area secondary containment system has been designed to accommodate a 24 hour 100 year rainfall event. The site has containment systems around all storage tanks. The FIRM is presented in Attachment 4.

1.5 Storage and Treatment Areas

Numerous storage tanks for the hazardous wastes that are new, used, or regenerated solvents, and treatment systems for the

.....continued

1.5 Storage and Treatment Areas (Cont'd)

regeneration of the spent solvents, are located throughout the site. A map showing the locations of the tanks and treatment locations is presented in Attachment 5. No underground storage tanks (USTs) are located on the property.

1.6 Existing Monitoring Wells

Two monitoring wells are located on the subject property. These two wells are located on the east side of the building, in the center of the property. BH-MW1-89 was completed on 05 April 1989, and BH-MW2-91 was completed on 09 October 1991. BH-MW1-89 was drilled to a depth of 110 feet below the ground surface, and BH-MW2-91 was drilled to a depth of 107.5 feet below the ground surface. The locations of the wells are presented on the most resent survey in Attachment 3. The detailed boring logs for these wells are presented in Attachment 6. No extraction or injection wells are located within a one mile radius of the subject property.

1.7 Wind Rose

A wind rose for the Detroit City Airport is presented in Attachment 7. The airport is located approximately 11 miles east of the subject property.

1.8 Vegetation

The vegetation in the area of the facility is very sparse due to the high traffic volume and the amount of gravel and road material covering the surface.

.....continued

1.9 Site History

This facility has been owned and operated by Detrex since 1950. Only halogenated solvents are sold and reclaimed at this facility.

One spill incident has been recorded at this facility. In March of 1990, a railroad tank car was leaking still residue (oily substance). Approximately 10 gallons of fluid, which contained trichloroethylene (approximately 6 pounds), was lost. Ten yards of soil was excavated in the area.

1.10 Past Permits

This facility is licensed under Act 64 for the sale, distribution, and reclaiming of halogenated solvents. Air and water discharge permits have been obtained from the City of Detroit and Wayne County for this site.

2.0 NATURE AND EXTENT OF CONTAMINATION

This section will detail information on the existing conditions and extent of contamination at this site.

2.1 Source Areas of Contamination

The Detrex facility has numerous storage containers for new and spent solvents. Attachment 5 contains a site map showing the location of all storage containers, sizes, and contents. These locations are all possible locations for potential releases.

.....continued

2.2 Existing Contamination

To date, 13 soil borings and two monitoring wells have been installed around the site. From the existing information gathered from the initial investigation, it appears that contamination does exist at this site. The contamination at this site is halogenated volatiles that are present in the soil. The work completed to date indicates that limited contamination exists within the fill material extending to the property boundaries. The contaminants decrease with depth. The contaminants do not extend below a depth of approximately 20.0 feet. Ground water samples were collected and analyzed from the two monitoring wells. The samples did not indicate the presence of any contaminants in the ground water.

The contaminants at this site have the potential to migrate through the backfill along the utility lines, as these are generally backfilled with sand or fill material that is more porous than the native soils throughout the facility. The fill material over the site and the fill material around the utilities is underlain by a clay that has a low permeability. The contaminants are not expected to leach into clay at an elevated rate as in the fill or sand. The ground water at this site is at a depth of approximately 97.0 feet below the ground surface. This ground water has not been affected, as indicated by the laboratory analysis.

The potential impact on human health and the environment is low due to the levels of contamination and the location of the site.

.....continued

3.0 IMPLEMENTATION OF INTERIM MEASURES

This section will document interim measures which have been taken or will be taken in the future.

3.1 Interim Measures

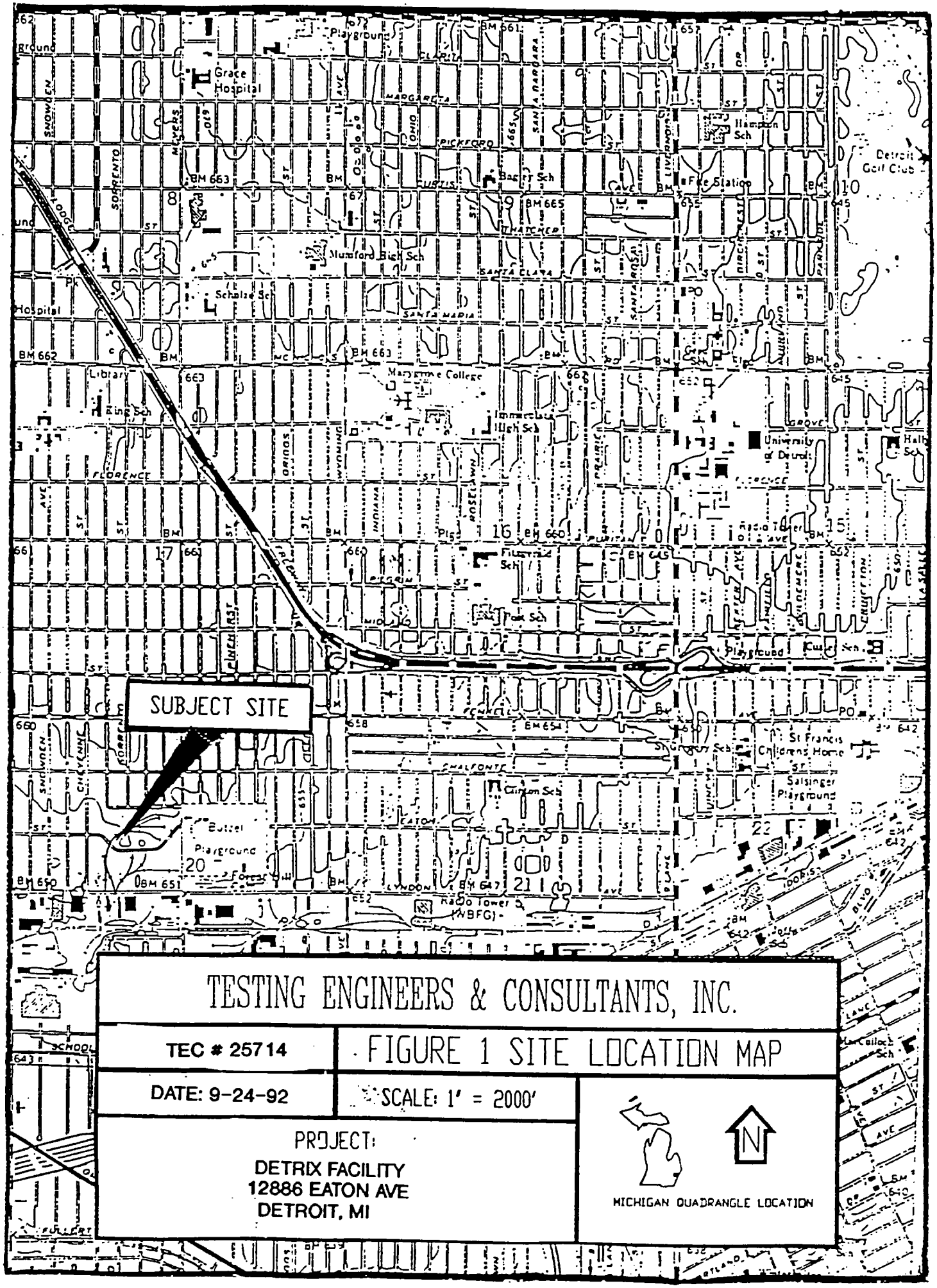
The interim measures that have taken place at this site to date are the installation of secondary containment around the tanks and transfer locations. The runoff water is collected and tested prior to the disposal into the sewer system.

Additional interim measures will be implemented after further studies and testing.

* * * * * *

ATTACHMENT 1

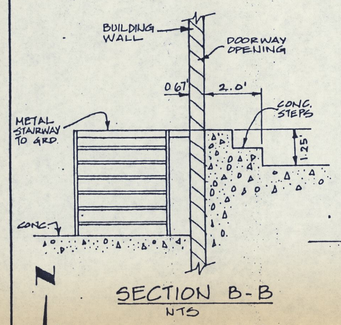
USGS TOPOGRAPHY MAP


SUBJECT SITE
Grace Hospital
Playground
Mumford High Sch
Schulze Sch
Maryanne College
Immaculate High Sch
Pilgrim Sch
Trinity Sch
Clinton Sch
Butzel Playground
St Francis Children's Home
Salsinger Playground
Detroit Golf Club
Hamtramck Sch
Fire Station
Baxter Sch
Radio Tower (WBFG)
TESTING ENGINEERS & CONSULTANTS, INC.
TEC # 25714
FIGURE 1 SITE LOCATION MAP
DATE: 9-24-92
SCALE: 1' = 2000'
PROJECT:
DETRIX FACILITY
12886 EATON AVE
DETROIT, MI
N
MICHIGAN QUADRANGLE LOCATION

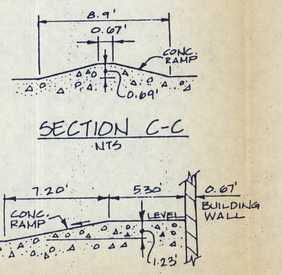
ATTACHMENT 2

SITE TOPOGRAPHY MAP

MULTI-COLOR Inc 1-44 M14F

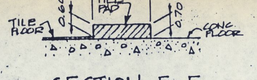


SECTION B-B
NTS



SECTION C-C
NTS

SECTION D-D
NTS



SECTION E-E
NTS

LEGEND

GROUND ELEVATION CONTOUR

DIRECTION OF SURFACE WATER RUNOFF FLOW

NOTE:

ELEVATIONS SHOWN ARE BASED ON U.S.G.S. DATUM. TO OBTAIN CITY OF DETROIT DATUM SUBTRACT 480.27 FROM ELEVATIONS SHOWN. TO OBTAIN U.S.C. & G.S. DATUM DATUM SUBTRACT 0.51 FROM ELEVATIONS SHOWN.

VICINITY MAP

SCALE: 1" = 200'

LEGAL DESCRIPTION

LOTS 16 AND 17 OF "HILL UNION BELT DEVELOPMENT SUBDIVISION", BEING THE N. 1/2 OF THE S. E. 1/4 OF THE N. W. 1/4 OF SEC. 20, T. 1 S., R. 11 E., CITY OF DETROIT, WAYNE COUNTY, MICHIGAN, ACCORDING TO THE PLAT THEREOF RECORDED IN THE OFFICE OF THE REGISTER OF DEEDS FOR WAYNE COUNTY, MICHIGAN IN LIBER 60 OF PLATS ON PAGE 62;

SUBJECT HOWEVER TO A PERMANENT EASEMENT HERETOFORE GRANTED TO THE PENNSYLVANIA, OHIO AND DETROIT RAILROAD OVER A STRIP OF LAND ON THE N'LY SIDE OF SAID LOTS FOR AN INDUSTRIAL RAILROAD TRACK AS PER DEED RECORDED IN L. 2298 OF DEEDS ON P. 176-178 WCR, AND,

RESERVING TO THE SELLERS, THEIR HEIRS AND ASSIGNS, AN EASEMENT OVER AND ACROSS THE N.W'LY AND N'LY REAR PORTIONS OF SAID LOTS 16 & 17 DESCRIBED AS "ALL THAT PORTION OF SAID LOTS LYING N'LY AND N.W'LY OF A LINE EXTENDING ACROSS SAID LOTS THAT IS 81 FEET S'LY OF THE CENTER OF THE RAILROAD SIDING AS PRESENTLY INSTALLED AND IN USE, CONNECTING WITH THE TRACK OF THE PENNSYLVANIA, OHIO AND DETROIT RAILROAD COMPANY; THE SAID EASEMENT TO COVER THE RIGHT TO USE THE SAME FOR PRIVATE RAILROAD SIDING AND RAILROAD SERVICES OVER SAME TO THE SAID PENNSYLVANIA, OHIO AND DETROIT RAILROAD, JOINTLY WITH ALL OTHER OWNERS OF LOTS 18, 19, 20, 21, 22, 23 AND 24 OF HILL UNION BELT DEVELOPMENT SUBDIVISION AFOREMAID, SO THAT RAILROAD SERVICE MAY BE HAD BY ALL OTHER OWNERS ALONG THE LENGTH OF THE SIDING AS NOW INSTALLED AND IN USE.

NOTE: ABOVE DESCRIPTION IS FROM DEED TO DETROIT REX PRODUCTS COMPANY DATED DEC. 30, 1941, RECORDED JANUARY 8, 1942 IN LIBER 5902, DEEDS, PAGE 226.

CERTIFICATION

WE HEREBY CERTIFY THAT WE HAVE SURVEYED THE PROPERTY HEREON, DELINEATED AND THAT THE DISTANCES SHOWN ARE TRUE AND CORRECT BY ACTUAL FIELD MEASUREMENTS AND THAT THERE ARE NO ENCROACHMENTS UNLESS OTHERWISE SHOWN.

DATED: July 11, 1985

WARNER, CANTRELL & PADMOS, INC.

BY: Donald A. Beaupied

DONALD A. BEAUPIED, REG. LAND SURVEYOR #11312

ATTACHMENT B-2

DATE: July 11, 1985

REVISIONS: JULY 26, 1985 — ADD TEST BORING & WELL LOCATION INFO. APRIL 10, 1989 — UPDATED FOR TRUCK WELL & PAVEMENT CONSTRUCTION APRIL 24, 1990 — ADDED CROSS SECTIONS D-D & E-E & NEW TANK AREA WALLS D-D, C-C, 4-23-91

PLAN OF SURVEY OF LOTS 16 & 17 OF "HILL UNION BELT DEVELOPMENT SUBDIVISION" BEING THE N.½ OF THE S.E. 1/4 OF THE N.W. 1/4 OF SEC. 20, T. 1S., R. 11 E., CITY OF DETROIT, WAYNE CO., MICH. (L. 60, P. 62)

SCALE: 1" = 20' — DATUM: U.S.G.S. (SEE NOTE ABOVE)

WARNER, CANTRELL & PADMOS, INC.
CIVIL ENGINEERS AND LAND SURVEYORS
20788 ORCHARD LAKE RD.
313-478-9494 FARMINGTON HILLS, MI. 48336

JOB NO.

PLAN FILE

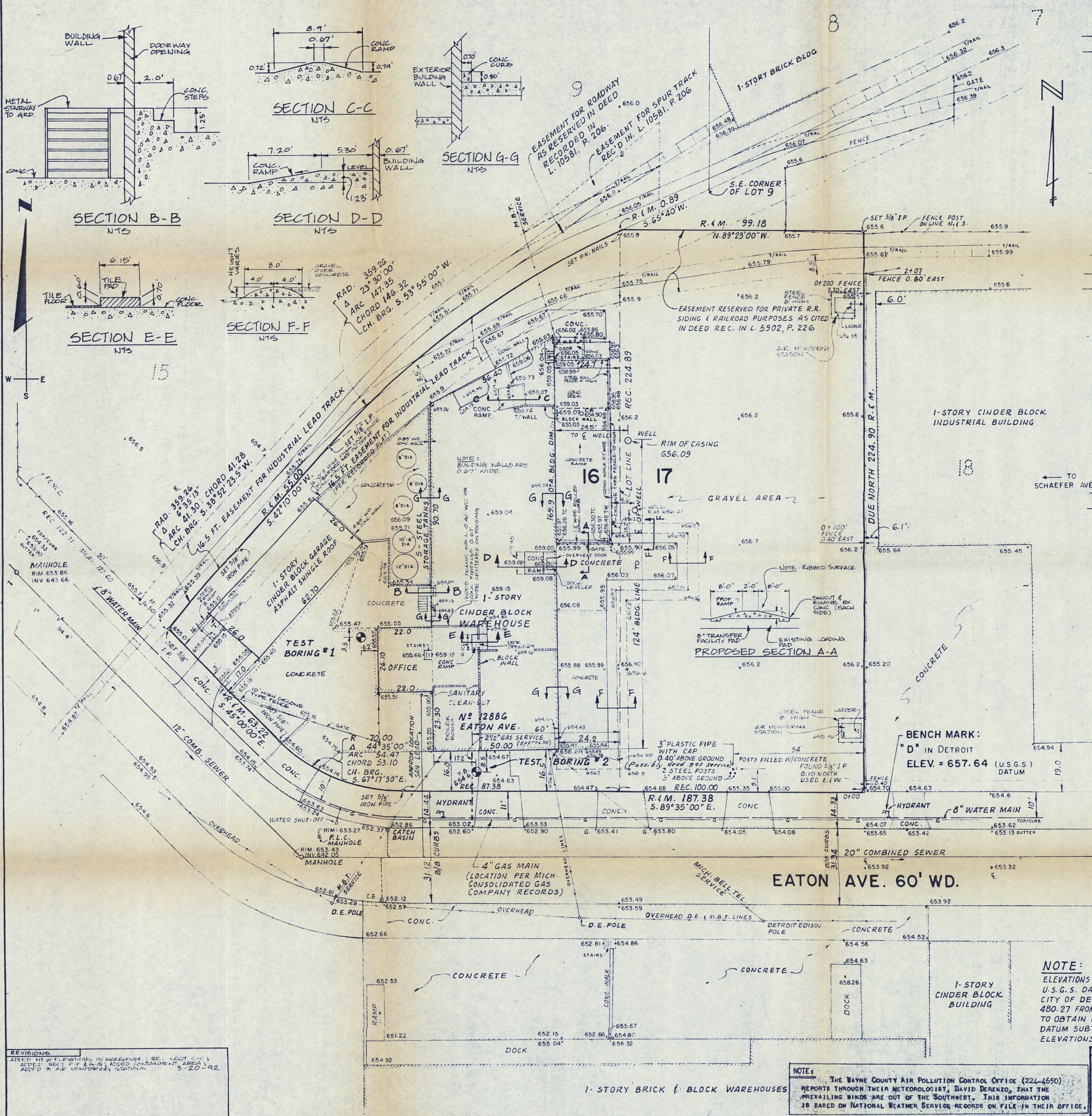
SHEET 1 OF 1

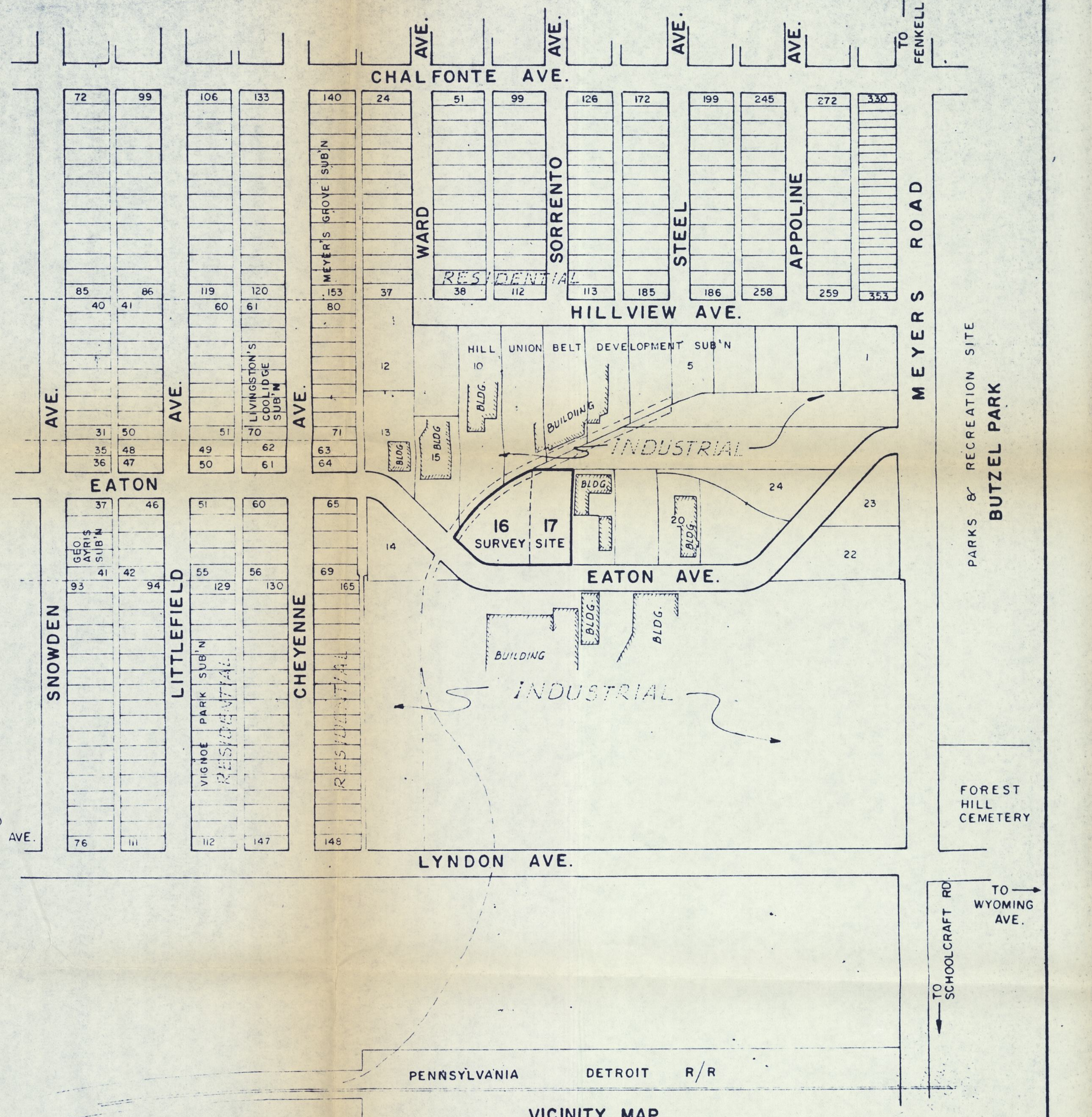
N. B. 614

CRA PROJECT No. 2471 DWG No. 02 FILE: S

ATTACHMENT 3

LEGAL SURVEY MAP WITH LEGAL DESCRIPTION





VICINITY MAP

SCALE: 1" = 200'

LEGAL DESCRIPTION

LOTS 16 AND 17 OF "HILL UNION BELT DEVELOPMENT SUBDIVISION", BEING THE N. 1/2 OF THE S. E. 1/4 OF THE N. W. 1/4 OF SEC. 20, T. 1 S., R. 11 E., CITY OF DETROIT, WAYNE COUNTY, MICHIGAN, ACCORDING TO THE PLAT THEREOF RECORDED IN THE OFFICE OF THE REGISTER OF DEEDS FOR WAYNE COUNTY, MICHIGAN IN LIBER 60 OF PLATS ON PAGE 62;

SUBJECT HOWEVER TO A PERMANENT EASEMENT HERETOFORE GRANTED TO THE PENNSYLVANIA, OHIO AND DETROIT RAILROAD OVER A STRIP OF LAND ON THE N'LY SIDE OF SAID LOTS FOR AN INDUSTRIAL RAILROAD TRACK AS PER DEED RECORDED IN L.2298 OF DEEDS ON P. 176-178 WCR, AND,

RESERVING TO THE SELLERS, THEIR HEIRS AND ASSIGNS, AN EASEMENT OVER AND ACROSS THE N.W.'LY AND N'LY REAR PORTIONS OF SAID LOTS 16 & 17 DESCRIBED AS ALL THAT PORTION OF SAID LOTS LYING N'LY AND N.W.LY OF A LINE EXTENDING ACROSS SAID LOTS THAT IS 8½ FEET S'LY OF THE CENTER OF THE RAILROAD SIDING AS PRESENTLY INSTALLED AND IN USE CONNECTING WITH THE TRACK OF THE PENNSYLVANIA, OHIO AND DETROIT RAILROAD COMPANY; THE SAID EASEMENT TO COVER THE RIGHT TO USE THE SAME FOR PRIVATE RAILROAD SIDING AND RAILROAD SERVICES OVER SAME TO THE SAID PENNSYLVANIA, OHIO AND DETROIT RAILROAD, JOINTLY WITH ALL OTHER OWNERS OF LOTS 18, 19, 20, 21, 22, 23 AND 24 OF HILL UNION BELT DEVELOPMENT SUBDIVISION AFORESAID, SO THAT RAILROAD SERVICE MAY BE HAD BY ALL OTHER OWNERS ALONG THE LENGTH OF THE SIDING AS NOW INSTALLED AND IN USE.

NOTE:
ABOVE DESCRIPTION IS FROM DEED TO DETROIT REX PRODUCTS COMPANY DATED DEC. 30, 1941, RECORDED JANUARY 8, 1942 IN LIBER 5902, DEEDS, PAGE 226.

CERTIFICATION

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WARNER, CANTRELL & PADMOS, INC.

DATE: July 11, 1985

BY: Donald A. Beaupied
DONALD A. BEAUPIED, REG. LAND SURVEYOR #11512

NOTE:
ELEVATIONS SHOWN ARE BASED ON U.S.G.S. DATUM. TO OBTAIN CITY OF DETROIT DATUM SUBTRACT 480.27 FROM ELEVATIONS SHOWN. TO OBTAIN U.S.C. & G.S. DATUM DATUM SUBTRACT 0.51 FROM ELEVATIONS SHOWN.

NOTE: THE WAYNE COUNTY AIR POLLUTION CONTROL OFFICE (224-4650) REPORTS THROUGH THEIR METEOROLOGIST, DAVID DERENZO, THAT THE PREVAILING WINDS ARE OUT OF THE SOUTHWEST. THIS INFORMATION IS BASED ON NATIONAL WEATHER SERVICE RECORDS ON FILE IN THEIR OFFICE.

REVISIONS
ADDED NEW ELEVATIONS IN WAREHOUSE; REV. SECT C-C; ADDED SECT F-F & G-G; ADDED CONTAINMENT AREA; ADDED 3 AIR MONITORING STATIONS 3-20-92

DATE: July 11, 1985
REVISIONS: JULY 26, 1985
ADD TEST BORING & WELL LOCATION INFO. APRIL 10, 1989
UPDATED FOR TRUCK WELL & PAVEMENT CONSTRUCTION APRIL 24, 1990
ADDED CROSS SECTIONS B-B, C-C, D-D & E-E & NEW TANK AREA WALLS 4-23-91
FOR MORE REVISIONS SEE BOTTOM LEFT

PLAN OF SURVEY OF LOTS 16 & 17 OF "HILL UNION BELT DEVELOPMENT SUBDIVISION"

BEING THE N. 1/2 OF THE S.E. 1/4 OF THE N.W. 1/4 OF SEC. 20, T. 1 S., R. 11 E., CITY OF DETROIT, WAYNE CO., MICH. (L. 60, P. 62)

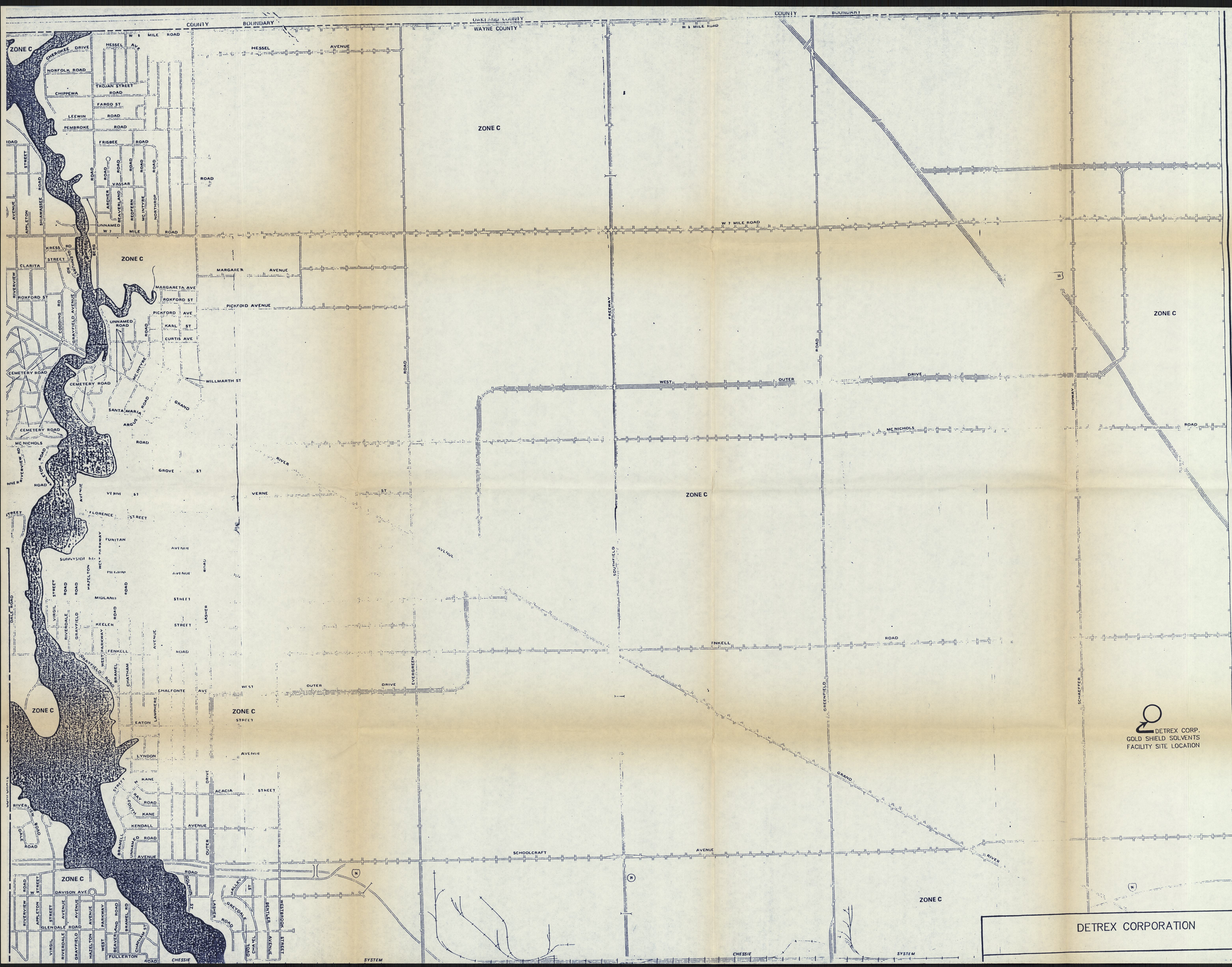
SCALE: 1" = 20'
DATUM: U.S.G.S. (SEE NOTE ABOVE)

WARNER, CANTRELL & PADMOS, INC.
CIVIL ENGINEERS AND LAND SURVEYORS
20788 ORCHARD LAKE RD.
313-478-9494 FARMINGTON HILLS, MI. 48336

JOB NO. 900408
PLAN FILE
N.B. 614
SHEET 1 OF 1

ATTACHMENT 4

FLOOD INSURANCE RATE MAP



500-Year Flood Boundary

100-Year Flood Boundary

Zone Designations* With Date of Identification e.g., 12/2/74

100-Year Flood Boundary

500-Year Flood Boundary

ZONE B

ZONE B

513

Base Flood Elevation Line With Elevation In Feet**

Base Flood Elevation In Feet Where Uniform Within Zone** (EL 987)

Elevation Reference Mark RM7×

River Mile M1.6

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
JULY 26, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:
FEBRUARY 7, 1975

FLOOD INSURANCE RATE MAP EFFECTIVE:
JULY 2, 1981

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.

APPROXIMATE SCALE
1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
DETROIT,
MICHIGAN
WAYNE COUNTY

PANEL 5 OF 45
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
260222 0005 B

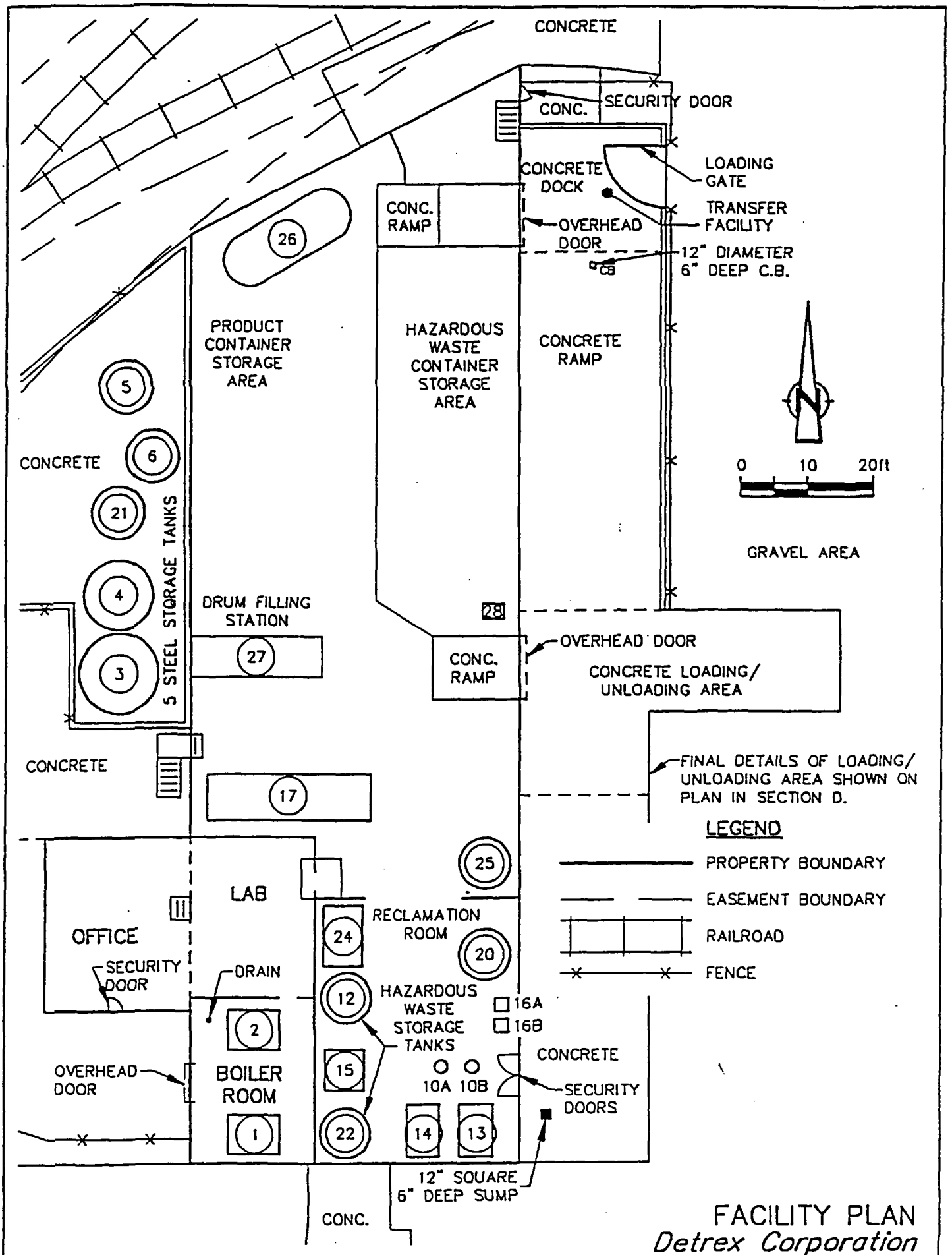
EFFECTIVE DATE:
JULY 2, 1981

DETREX CORPORATION

ATTACHMENT 5

TANK AND TREATMENT LOCATIONS

ATTACHMENT D-1



FACILITY PLAN
Detrex Corporation
Eaton Avenue Facility, Detroit

CRA (REVISED 09/03/91)

Date: 09/03/91
Revision: 91-2

LIST OF PROCESS EQUIPMENT

I.D. No.	*Equipment Name*	*Description*
1.	Generator	Clayton Model E-100 Steam Generator. Unit burns natural gas to produce steam at the rate of 3450 lbs./hr. at 100 psig.
2.	Air Compressor	
3.	20,000 gal. Product Tank	20,000 gallon carbon steel storage tank for storage of 1,1,1 Trichloroethane.
4.	10,000 gal. Product Tank	10,000 gallon carbon steel storage tank for storage of Trichloroethylene
5.	4,500 gal. Product Tank	4,500 gallon carbon steel storage tank for storage of Perchloroethylene.
6.	4,500 gal. Product Tank	4,500 gallon carbon steel storage tank for storage of Trichloroethylene
10 A/B	2 - 600 gal. Receiver Tanks	Used for receiving product from Detrex stills. (Operated at atm. pressure).
12.	2,300 gal. Hazardous Waste tank storage tank	2,300 gallon carbon steel storage tank used for storage of F001 or F002 material prior to processing
13.	350 gal. Detrex Still	Detrex Model S-350. Used for recovering chlorinated solvents from spent solvents from degreasing operations (F001 material) via distillation. This unit can process approximately 2,000 gallons/day.
14.	350 gal. Detrex Still	Detrex Model S-600. Used for recovering chlorinated solvents from spent solvents from degreasing operations (F001 material) via distillation. This unit can process approximately 2,000 gallons/day.
15.	DCI Still	DCI Model Dyna-1-100 Solvent Recovery Still. Used to recover chlorinated solvents from still bottoms from recovery of same (F002 material) via live steam injection. This unit can process approximately 100 gallons per hour.
16 A/B	Drying Columns	Detrex Dual Column Drier. Used to remove water from recovered product (solvent) via adsorption.

Date: 09/03/91
Revision: 91-2

LIST OF PROCESS EQUIPMENT

I.D. No.	*Equipment Name*	*Description*
17.	5,000 gal. Still Bottom Tank	5,000 gallon carbon steel storage tank. Used for temporary accumulation of still bottoms from recovery of chlorinated solvents (F002 material).
20.	2,500 gal. Holding Tank	2,500 gallon 316 stainless steel storage tank used for storage of reclaimed solvent.
21.	4,500 gal. 1,1,1 Trichloroethane	4,500 gallon carbon steel storage tank for storage of 1,1,1 Trichloroethane.
22.	4,500 gal. Hazardous Waste Storage Tank	4,500 gallon carbon steel storage tank used for temporary storage of F001 or F002 material prior to being processed by Detrex stills.
24.	DCI Still	DCI Model Dyna-1-500 Solvent Recovery Still. Used to recover chlorinated solvents from still bottoms from recovery of same (F002 material) via live steam injection. This unit can process approximately 500 gallons per hour.
25.	3,000 gal. Holding Tank	3,000 gallon 316 stainless steel storage tank used for storage of reclaimed solvent.
26	SVRM - Carbon Absorption Unit	
27.	Drum Filling Station	Product Drumming Station. Used for filling 55-gallon drums with product. Unit can fill approximately 30 drums per hour and is operated as necessary.
28.	Product Blending Vessel	550 gallon carbon steel vessel utilized for product blending.

ATTACHMENT 6

BORING LOGS AND WELL LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-08)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH7-91

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 8, 1991

CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA

LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
2.5	FILL, medium grained, loose, brown, moist						
5.0		-5.0					
	CL-CLAY, some sand, fine grained, stiff, gray, moist	-6.0					
7.5	CL-CLAY, trace gravel, stiff, gray, moist		10" ø BOREHOLE				
10.0							
12.5	- same, very stiff		CUTTINGS				
15.0							
17.5							
20.0	- same, with trace sand			1SS		15	0
22.5							
25.0		-25.0		2SS		17	0
	END OF HOLE @ 25.0 FT. BGS						
27.5	NOTES: 1. Water not encountered.						
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-09)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH8A-91

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 14, 1991

CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA

LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
	FILL, some sand, trace gravel, medium grained, loose, brown, moist						
		-2.0					
2.5	Concrete						
		-4.0	▽ 6" ø BOREHOLE				
	SP-SAND, trace gravel, medium to coarse grained, loose, gray, wet		CUTTINGS				
5.0				1SS		7	0
7.5		-7.5					
	CL-CLAY, trace gravel, trace sand, fine grained, firm, gray, wet			2SS		3	0
10.0		-10.0					
	END OF HOLE @ 10.0 FT. BGS						
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-10)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH9-91

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 14, 1991

CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA

LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE N VALUE	SAMPLE HNu (ppm)
2.5	FILL, some sand, trace brick, trace gravel, medium grained, loose, black stained, moist		10" ø BOREHOLE	1SS		15	6
5.0	SC-SAND, some clay, medium grained, soft, brown, moist	-5.0	CUTTINGS	2SS		4	6
7.5	CL-CLAY, trace silt, trace gravel, fine grained	-6.0		3SS		7	0
10.0	CL-CLAY, some silt, trace sand, trace gravel, fine grained, stiff, brown, moist	-8.0		4SS		26	0
12.5	END OF HOLE @ 10.0 FT. BGS	-10.0					
15.0	NOTES: 1. Water not encountered.						
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-11)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH10-91

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 14, 1991

CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA

LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
	FILL, some sand, medium grained, loose, tan, black stained, moist			1SS		16	0
2.5	FILL, some sand, trace gravel, medium grained, medium dense, brown, moist	-2.0		2SS		32	0
5.0	CL-CLAY, some silt, trace sand, fine grained, firm, gray brown mottled, moist	-4.0	10" ø BOREHOLE; CUTTINGS	3SS		15	0
7.5				4SS		26	0
	CL-CLAY, some silt, trace sand, trace gravel, fine grained, stiff, brown, moist	-8.0		5SS		33	0
10.0	END OF HOLE @ 10.0 FT. BGS	-10.0					
	NOTES: 1. Water not encountered.						
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-07)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH-MW2-91
(Page 1 of 4)
PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 9, 1991
CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA / ROTARY
LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE N VALUE	SAMPLE HNu (ppm)
2.5	FILL, medium grained, loose, brown, moist, black stained						
	SC-SAND, some clay, fine grained, loose, moist	-3.0					
5.0	CL-CLAY, trace silt, trace gravel, fine grained, stiff, brown, moist	-4.0					
7.5			4"ø CASING				
10.0			CEMENT/ BENTONITE GROUT				
12.5							
15.0	CL-CLAY, trace gravel, fine grained, stiff, gray, moist	-13.5	10"ø BOREHOLE				
17.5			CEMENT/ BENTONITE GROUT				
20.0	- same, trace sand						
22.5			2"ø WELL PIPE				
25.0							
27.5			3 7/8"ø MUD ROTARY				
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-07)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH-MW2-91 (Page 2 of 4)

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 9, 1991

CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA / ROTARY

LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
	CL-CLAY, trace gravel, fine grained, stiff, gray, moist						
35.0							
37.5							
40.0							
42.5			2"ø WELL PIPE				
45.0							
47.5							
50.0			CEMENT/ BENTONITE GROUT				
52.5							
55.0			3 7/8"ø MUD ROTARY				
57.5							
60.0							
62.5							
65.0							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-07)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
PROJECT NO.: 2471
CLIENT: DETREX CORPORATION, EATON AVENUE
LOCATION: DETROIT, MI

HOLE DESIGNATION: BH-MW2-91 (Page 3 of 4)
DATE COMPLETED: OCTOBER 9, 1991
DRILLING METHOD: HSA / ROTARY
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
67.5							
70.0	– same, trace sand						
72.5							
75.0			3 7/8"ø MUD ROTARY				
77.5			CEMENT/ BENTONITE GROUT				
80.0							
82.5			2"ø WELL PIPE				
85.0							
87.5							
90.0	– same, soft			1SS		8	
92.5	– same, trace sand, stiff		BENTONITE PELLET SEAL	2SS		17	
95.0	– same, trace sand, firm			3SS		14	
	– same, trace sand, stiff						
97.5	SM-SAND, some gravel, some clay, some silt, medium to coarse grained, dense, gray, wet	-97.0	SAND PACK	4SS		49	
			WELL SCREEN	5SS		86	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-07)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH-MW2-91 (Page 4 of 4)

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 9, 1991

CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA / ROTARY

LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
100.0	SP-SAND, trace gravel, trace silt, medium to coarse grained, dense, gray, wet	-100.0	3 7/8"ø MUD ROTARY; SAND PACK; WELL SCREEN; 2"ø WELL PIPE	6SS	X	65	
102.5	SW-SAND, fine grained, very dense; gray, wet	-102.0		7SS	X	114	
	- same, except fine to medium, dense.						
105.0	- same, except fine, very dense			8SS	X	87	
	SP-SAND, trace gravel, fine, medium to coarse grained, dense, gray, wet	-106.0		9SS	X	88	
107.5	END OF HOLE @ 107.5 FT. BGS	-107.5					
110.0							
112.5							
115.0							
117.5							
120.0							
122.5							
125.0							
127.5							
130.0							

SCREEN DETAILS:
Screened Interval:
97.5 to 107.5' BGS
Length -10.0'
Diameter -2.0"
Slot # 6
Material -Stainless Steel
Sand pack interval:
93.5 to 107.5' BGS
Material -Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND ▽ STATIC WATER LEVEL

ATTACHMENT 7

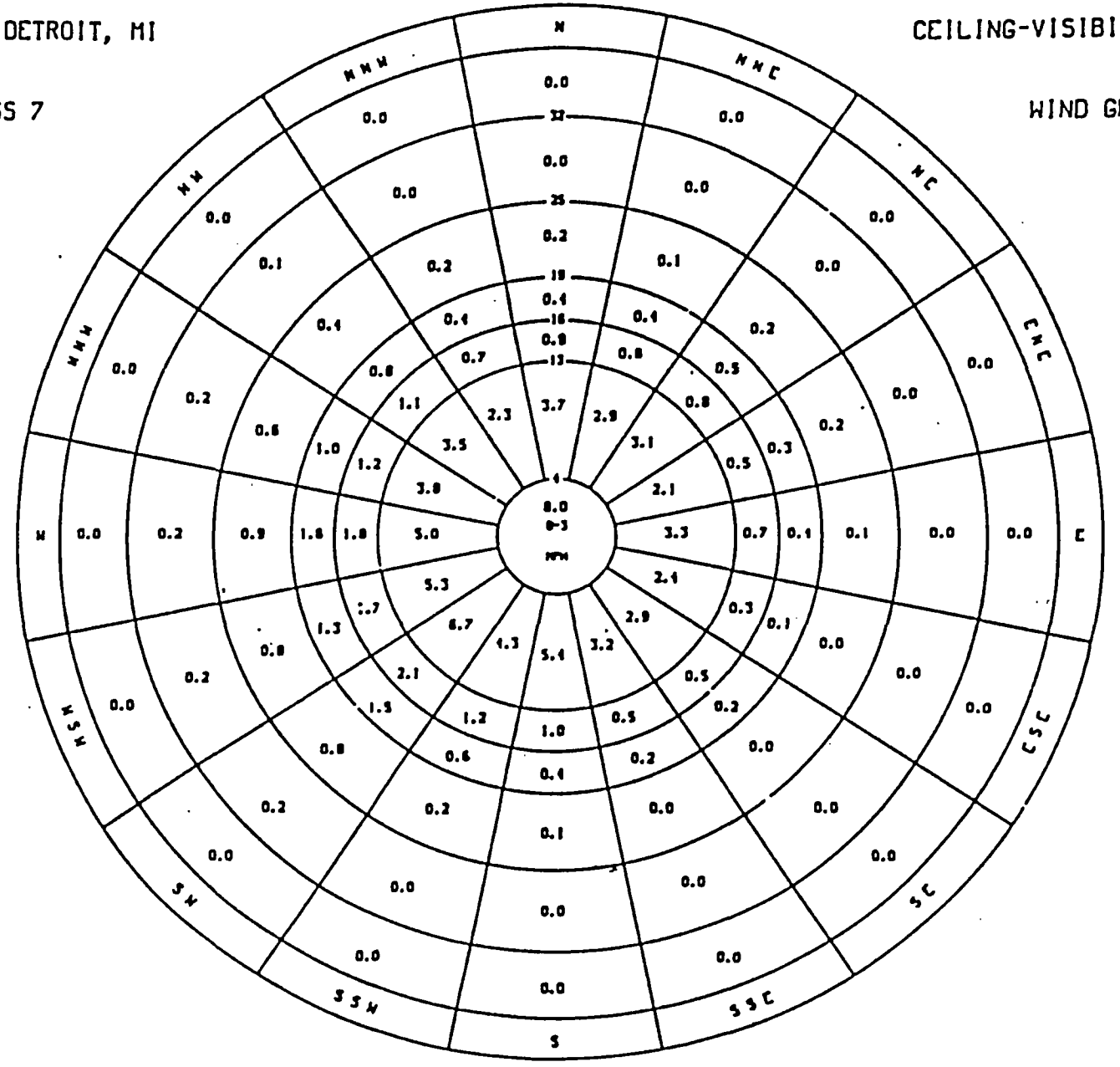
WIND ROSE

DTW DETROIT, MI

CEILING-VISIBILITY

CLASS 7

WIND GRAPH



WIND ROSE

Detrex Corporation

Eaton Avenue Facility, Detroit

PRE-INVESTIGATION EVALUATION OF CORRECTIVE MEASURES TECHNOLOGIES

DETREX CORPORATION
MID 091 605 972

TASK II - ATTACHMENT I

Testing Engineers & Consultants, Inc.
P.O. Box 249
1333 Rochester Road
Troy, Michigan 48083-6015
(313) 588-6200 or Dial (313) T-E-S-T-I-N-G

08 October 1992

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PRE-INVESTIGATION EVALUATION OF CORRECTIVE MEASURES TECHNOLOGIES

TASK II - ATTACHMENT I

1.0 BACKGROUND

Based on the results of previous studies conducted on the Eaton Avenue site, the following conclusions can be drawn:

- The site geology consists of approximately 3.0 to 4.0 feet of sand, underlain by a thick layer of clay.
- The sand is composed of an upper unit of fill and a lower unit of native material.
- No ground water or perched water (with the exception of one boring) is present within approximately 90 feet of the surface.
- The contamination at the site consists of low to moderate levels of Volatile Organic Compounds (VOCs) present in the fill/native sand and in the upper portion of the clay.

2.0 CORRECTIVE MEASURES TECHNOLOGIES

2.1 Introduction

Potential corrective measures technologies are discussed in the following sections. Each section describes the technology and presents a discussion of the field data that needs to be collected during the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) to facilitate the evaluation of that particular technology.

2.2 Excavation/Landfilling

This option involves the physical removal and landfilling of all or portions of the contaminated soil.

.....continued

2.2 Excavation/Landfilling (Cont'd)

The excavation may continue until all of the contaminated soil (i.e., until non-detect concentrations are achieved) is removed, or until closure under Michigan Act 307 Type B Criteria is feasible. To evaluate these options, the following data needs to be collected:

- Delineation of the horizontal and vertical extent of VOCs to both non-detect concentrations and Type B Closure Criteria acceptable levels.
- Determination of the presence and concentration of VOCs under existing structures.
- Concentration of VOCs by Toxicity Characteristic Leachate Procedure analysis to determine their leachability (thus the potential for modified Type B Closure) and waste characterization properties (i.e., hazardous vs. non-hazardous).

2.3 Soil Vapor Extraction

This option is an in-situ remediation technique that involves extracting volatile organic vapors from contaminated soil. Target cleanup levels can be based on non-detect or Type B Criteria. To evaluate this option, the following data needs to be collected:

- Maximum and average concentration of VOCs;
- Particle site distribution (particularly clay content);
- Moisture content;
- Permeability;
- Organic carbon content.

.....continued

2.4 Low Temperature Thermal Desorption

Low temperature thermal desorption processes are used to separate VOCs from soil via evaporation. They utilize air, heat mechanical agitation, or a combination of the processes to transfer the VOCs from the soil into a gas steam. The gas steam is then treated further or released into the atmosphere, while the soil can be reused as backfill at the site or elsewhere. The data which needs to be collected to evaluate this option is:

- Soil moisture content;
- Maximum and average concentration of contaminants;
- Total volume of soil requiring treatment;
- The presence of contaminants beneath existing structures;
- Soil organic content.

* * * * * *

PROJECT MANAGEMENT PLAN

DETREX CORPORATION
MID 091 605 972

TASK IIIA - ATTACHMENT I

Testing Engineers & Consultants, Inc.
P.O. Box 249
1333 Rochester Road
Troy, Michigan 48083-6015
(313) 588-6200 or Dial (313) T-E-S-T-I-N-G

08 October 1992

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PROJECT MANAGEMENT PLAN

TASK IIIA - ATTACHMENT I

1.0 INTRODUCTION

The Project Management Plan is being written as part of the Federal Hazardous Waste Permit Conditions (Detrex Corporation, Solvents and Environmental Services Division, Detroit, Michigan, MID 091 605 972). Specifically, this plan addresses the permit condition outlined under III. Corrective Action Requirements - C. Fill and Soil. The investigation is being undertaken by Testing Engineers & Consultants, Inc., of Troy, Michigan, for Detrex Corporation.

The technical approach and Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Workplan documents for this study were developed based on RFI (Attachment I) documents supplied along with the Permit. The components of the investigation have been developed specifically for this site; the Workplan documents reflect activities and plans that are site-specific.

1.1 Purpose

The purpose of the facility investigation is to evaluate the nature and extent of the release(s) of hazardous constituents; to evaluate the facility characteristics; and to eventually identify, develop, and implement warranted corrective measures to protect human health and the environment.

.....continued

1.2 Scope of Work

The scope of the facility investigation includes the gathering of specific information necessary to evaluate the characteristic extents and nature of hazardous constituents in the soil, as well as to evaluate feasible corrective action measures. The Project Management Plan will provide discussion of the technical approach to the study, present a proposed schedule, and present the overall management approach to the facility investigation. The Project Management Plan is designed to be a flexible document with work elements that can be expanded, reduced, or eliminated based on the data gathered during the investigation.

1.3 Previous Investigations

Previous investigations have been undertaken at the Detrex - Eaton Avenue facility and are the basis for the proposed additional investigations described in this plan. Two specific data collection activities have been completed to date:

1. One monitoring well and two borings were completed by Conestoga-Rovers & Associates Limited in 1989.
2. An additional monitoring well and 10 borings were completed by Conestoga-Rovers & Associates Limited in 1991.

The previous investigations determined that Volatile Organic Compounds (VOCs) are present in the fill and upper portion of the natural clays that exist at the site. The suspected source of contamination appears to be a result of runoff that occurred historically at the site before preventative containment practices

.....continued

1.3 Previous Investigations (Cont'd)

were required for SWMUs. There is no ground water encountered until approximately 110 feet below the surface. Since soil contamination to this point does not appear to occur at depths greater than 15.0 feet below the surface, and the fact that previous sampling of the ground water did not indicate any VOC contamination, no hydrogeologic investigation will be performed on the site. The following section describes the technical approach that will be taken to further assess the nature and extent of VOC contaminants in the soil for the site.

2.0 TECHNICAL APPROACH

The recent investigations at the Detrex - Eaton Avenue facility indicate the need for additional investigations to reach the ultimate implementation of appropriate corrective actions. Two regulatory issues are involved in the study:

- Surface water runoff;
- Soil contamination.

2.1 Concentrated Source Assessment

This task includes the investigation of historical potential contaminant sources and how surface drainage (runoff) has distributed VOC contaminants. Specific work will include the following activities:

- Performing historical research and interviewing on past operations and areas of overspill;

.....continued

2.1 Concentrated Source Assessment (Cont'd)

- Compilation of existing data to determine any trends or possible hotspots of contamination that can be correlated to current runoff patterns.

2.2 Soil Contamination

From previous investigations, the near surface lithology consists of a medium-grained, loose, moist fill to a depth of 3.0 feet, underlain by a foot of sand. Below this layer, to a depth of 13.5 feet, appears to be silty clay. Below this layer, to a depth of 97.0 feet, appears to be stiff, gray clay which is indicative of this region.

The contamination appears to be confined to the top three soil types, with a possible few feet of contamination in the gray clay layer. VOCs have been detected in previous borings performed on the site. It has been determined that further soil borings will be necessary to determine the vertical and horizontal extents of contamination. Due to the fact the very few of the previous sample analyses were able to be validated, some duplication of work will be necessary. It is the intent of the investigation to determine extents and patterns of contamination in each of the three or four soil types found to be affected at the site. It is further expected that geotechnical characteristics such as permeability, porosity, organic content, and moisture content of each soil type be determined in order to determine the feasibility of different remedial technologies.

.....continued

3.0 PROJECT MANAGEMENT

The RFI is being conducted for Detrex Corporation by Testing Engineers & Consultants, Inc., of Troy, Michigan, with the approval and oversight by the Michigan Department of Natural Resources (MDNR) and the Environment Protection Agency (EPA - Region V). All workplans, data collection plans, quality assurance plans, and reports will be based on the RFI (Attachment I) that was submitted with the Detrex permit.

The Project Manager will be directly responsible to Detrex Corporation and will maintain communication with the MDNR and U.S. EPA as necessary. Attachment 1 shows the Project Organizational Chart.

The Quality Assurance (QA) Manager is directly responsible to the Project Manager, who has ultimate responsibility for quality assurance of the project. The QA Manager is responsible for conducting staff training in QA procedures and requirements; internal, system, and performance audits; and for identifying and implementing corrective actions.

The Health and Safety Coordinator also is directly responsible to the Project Manager. The Health and Safety Coordinator has the responsibility to properly train the field crew and any subcontractors in appropriate health and safety techniques, including field instrument use, protective clothing use, and decontamination procedures. The Health and Safety Coordinator will conduct field audits and oversee the on-site Health and Safety Officer.

.....continued

3.1 Project Organization

The investigation generally is divided into four categories as shown in Attachment 1; site investigations, laboratory analysis, investigation analysis, and reporting. Site investigations include all field activities such as research, test borings, stratigraphy characterization, and soil sampling. The field crew will consist of a Site Manager, Health and Safety Officer, Field Geologist, and Drill Rig Operator and Assistant, as required.

Laboratory analysis includes physical and chemical analysis. Both physical and chemical analysis will conducted by Testing Engineers & Consultants, Inc.

Investigation analysis includes data reduction, validation, and evaluation. Procedures for these activities are provided in the Data Management Plan and Quality Assurance Project Plan (QAPjP).

4.0 SCHEDULE

The schedule to complete the Facility Investigation is outlined below, and a time line can be found in Attachment 2. The start date of the schedule is 27 September 1992. This is 90 days from the date the permit was issued. For the purposes of this schedule, the EPA/MDNR reviews will be assumed to take four weeks. Deviations from this assumption by the EPA/MDNR will not affect the time duration required for Testing Engineers & Consultants, Inc. to complete the required task, and therefore, the schedule will only be offset the additional time it takes the EPA/MDNR to complete their reviews. Following the review of the RFI Workplan, the schedule will adhere to

.....continued

4.0 SCHEDULE (Cont'd)

the time stated by the permit for resubmittal of the workplan (60 days). Upon approval of the workplan, the implementation of the Facility Investigation will begin within 30 days (also stated in the permit). The Field Investigation Team will require one week of on-site work to complete the proposed drilling and sample collection procedures. Laboratory analysis will require two weeks to obtain final results. Validation will require an additional three days for QA Manager review. Investigation analysis will require two weeks, and an additional week of report preparation will be required.

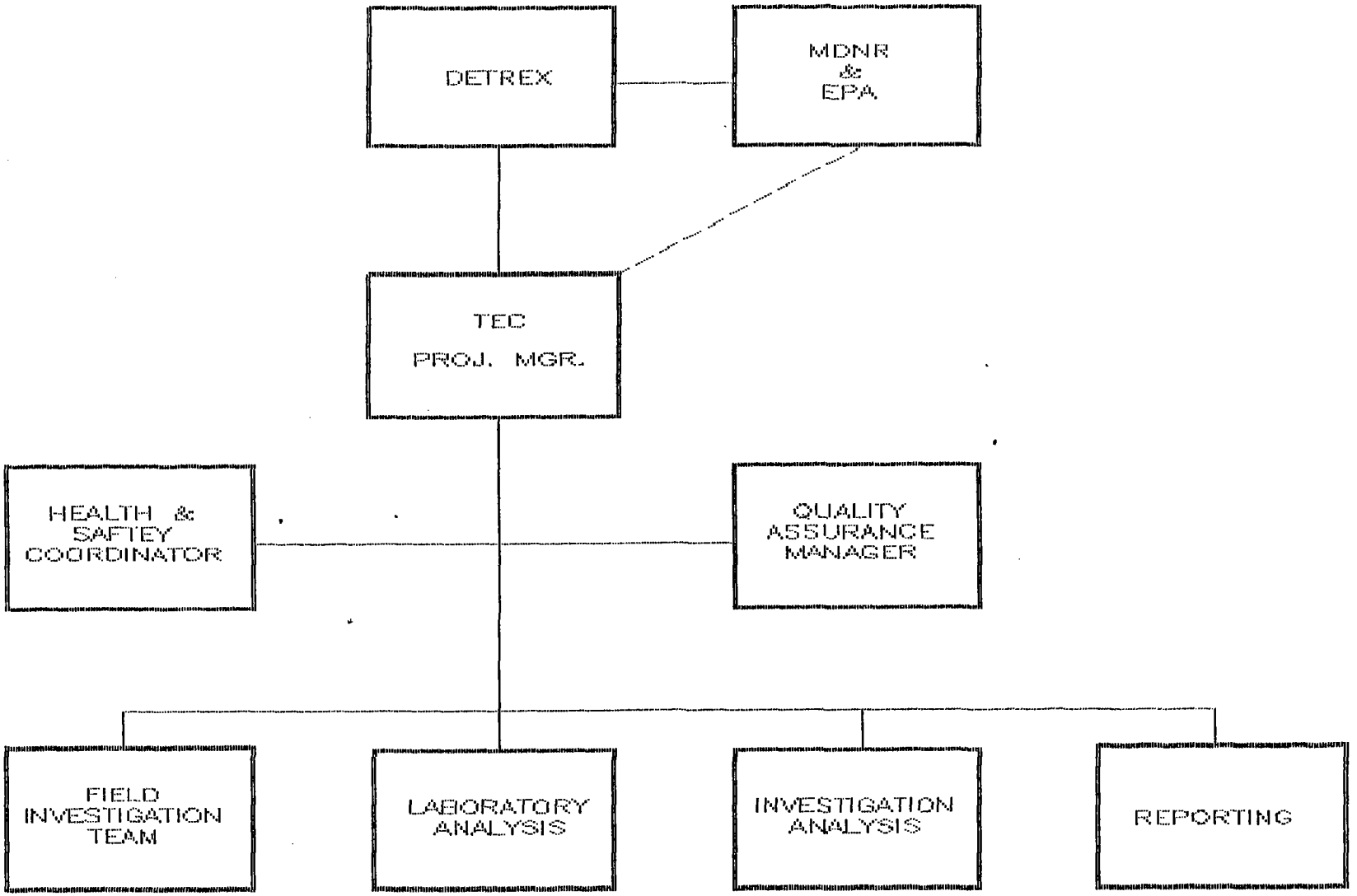
5.0 PROJECT PERSONNEL

Resumes of Project Personnel can be found in Attachment 3.

* * * * * *

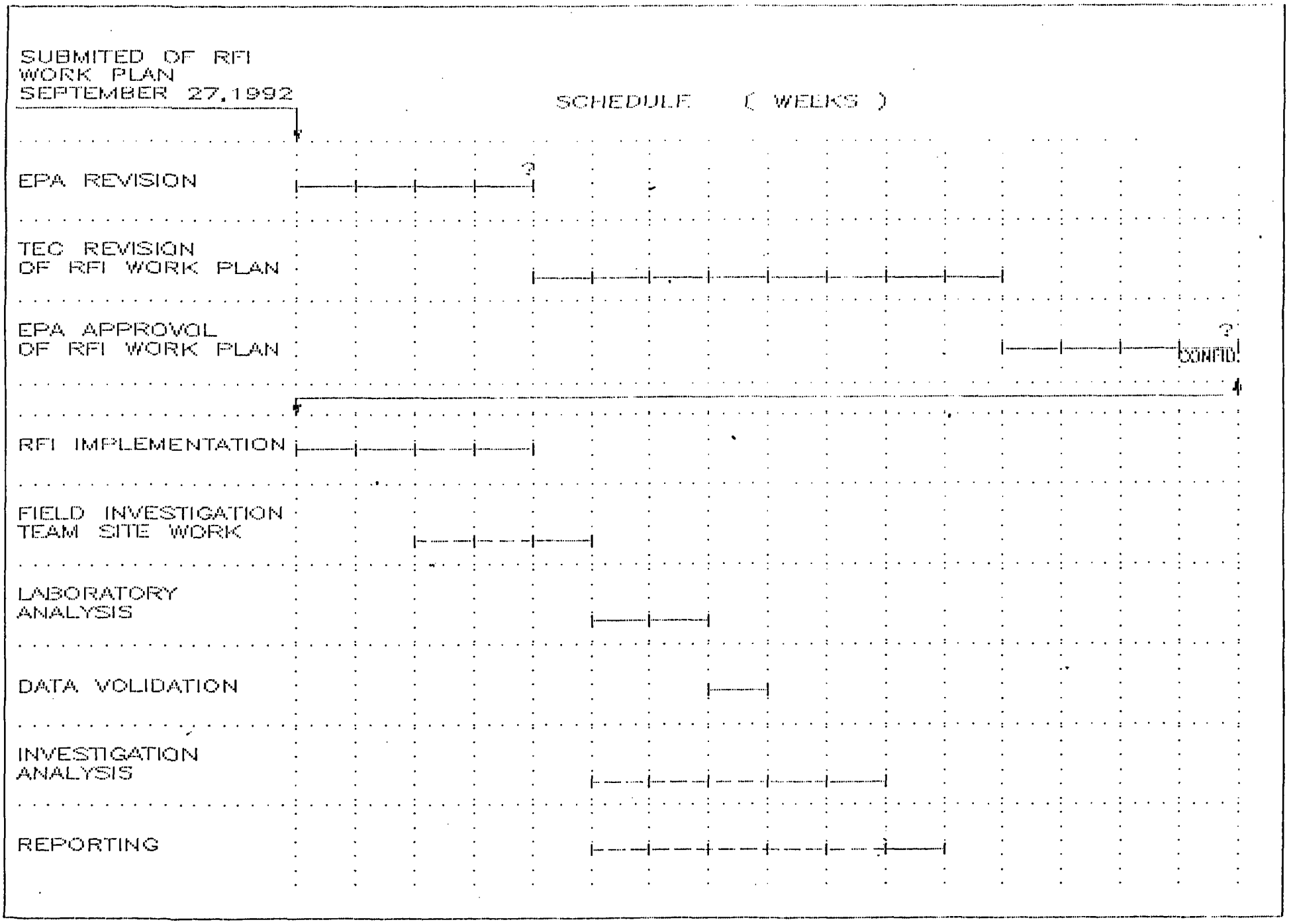
ATTACHMENT 1

PROJECT ORGANIZATIONAL CHART


DETREX
MDNR
&
EPA
TEC
PROJ. MGR.
HEALTH &
SAFTEY
COORDINATOR
QUALITY
ASSURANCE
MANAGER
FIELD
INVESTIGATION
TEAM
LABORATORY
ANALYSIS
INVESTIGATION
ANALYSIS
REPORTING

ATTACHMENT 2

PROJECT TIME LINE



ATTACHMENT 3

PROJECT PERSONNEL QUALIFICATIONS

FREDERICK G. ROESER

TITLE:

Project Hydrogeologist
Environmental Assessment Department

EDUCATION:

B.S., Geology
Michigan State University, 1987

M.B.A., Management
Oakland University, 1992

PROFESSIONAL DEVELOPMENT:

40-Hour Hazardous Waste Training Certification (OSHA)
8-Hour Site Supervisor/Manager Health & Safety Course (OSHA)
NIOSH 582 Equivalent Fiber Counting Course

EXPERIENCE:

Five (5) years experience in supervision of environmental site assessment investigations, hydrogeological studies, soil and water sample collection and field analysis, soil gas surveys, underground storage tank management, geophysical surveys utilizing ground penetrating radar, remedial investigations and management, and hazardous waste (Act 64) closures. Responsibilities include client consultation, design and planning of environmental investigations, and project management. Experience also includes sampling and analysis of airborne asbestos fibers, bulk sampling for asbestos, and supervision of asbestos abatement contractors. Developed QA/QC procedures and practices in accordance with AIHA recommendations for asbestos fiber counting lab.

SAMPLING OF PROJECTS:

Environmental Site Assessments

Phase I of an existing 200,000-square foot industrial complex - Warren, MI
Phase II of potential contamination from leaking underground storage tanks - Dearborn, MI
Phase II of potentially hazardous heavy metal contamination - Roseville, MI
Phase III of barium-contaminated soils - Roseville, MI
Phase III to determine the extent of gasoline contamination migrating along a road - Pontiac, MI
Phase III to determine the vertical and horizontal extent of contamination at a site located adjacent to a LUST (Leaking Underground Storage Tank) site - Dearborn, MI
Phase III contamination assessment of a pond (included soil, water, and fish sampling) - Farmington Hills, MI

FREDERICK G. ROESER (Cont'd)

SAMPLING OF PROJECTS (Cont'd)

Environmental Site Assessments (Cont'd)

- Phase III remedial investigation of trichloroethylene-contaminated soil - Detroit, MI
- Phase III contamination assessment of a Michigan Act 307 site - River Rouge, MI
- Phase IV interim pump and treat remediation for contaminated ground water resulting from a leaking underground storage tank - Warren, MI
- Phase I, II, III, and IV at an active Michigan Act 307 site - Pontiac, MI
- Phase IV soil venting remediation at a gas station where the contamination had migrated under a major highway - Oak Park, MI
- Phase IV soil venting feasibility study where contamination had resulted from a leaking underground storage tank located beneath the building's foundation - Marysville, MI

Underground Storage Tank Management

- Monitored the removal of tanks at a waste transfer station - Detroit, MI
- Monitored the removal of tanks at a warehouse facility - Detroit, MI
- Monitored the removal of tanks at an automotive facility - Detroit, MI

Hydrogeological Investigations

- Investigation and computer modeling of the contaminant flow of a trichloroethylene-contaminated aquifer - Southfield, MI
- Lake level stabilization study to determine whether the development of a nearby subdivision would affect the lake - Northville, MI
- Investigation to determine the aquifer characteristics at a gasoline service station - Rochester, MI
- Investigation to determine the well field drinking water yield at an outdoor music theater - Clarkston, MI

Ground Penetrating Radar Investigation

- Underground storage tanks at a demolished gasoline service station - Detroit, MI
- Underground utilities and storage tanks at a gasoline service station - Detroit, MI

Asbestos Management

- Air and abatement monitoring during the asbestos removal at an industrial revitalization project - Detroit, MI
- Building survey of a major exposition/conference center - Detroit, MI

TECHNICAL SOCIETY AFFILIATIONS:

National Water Well Association

ANDREW J. FOERG

TITLE:

Project Geologist
Environmental Assessment Department

EDUCATION:

B.S., Geology
Wayne State University, 1985

Hazardous Materials Management Certificate
Wayne State University, expected 1992

PROFESSIONAL DEVELOPMENT:

40-Hour Hazardous Waste Training Certification (OSHA)
8-Hour Site Supervisor/Manager Health & Safety Course (OSHA)

EXPERIENCE:

Five (5) years experience in supervision of environmental site assessment investigations, hydrogeological studies, soil and water sample collection and field analysis, soil gas surveys, underground storage tank management, geophysical surveys utilizing Ground Penetrating Radar, remedial investigations and management, and hazardous waste (Act 64) closures. Responsibilities include client consultation, design and planning of environmental investigations, and project management. Experience also includes enforcing solid waste/hazardous waste regulations at facilities located in Wayne County and the coordination and implementation of Michigan Department of Natural Resources Groundwater Monitoring Program at solid waste disposal sites located in southeastern Michigan.

SAMPLING OF PROJECTS:

Environmental Site Assessments

Phase I of three city blocks prior to demolition at the proposed site of a new hospital - Detroit, MI
Phase I of a metal working facility - Detroit, MI
Phase I of a 300-acre parcel including a medical research facility - Rochester, MI
Phase I of a bulk warehouse facility - Detroit, MI
Phase II and development of a remedial investigation workplan for a tool and die facility - Warren, MI
Phase II to determine the impact of leaking drums located adjacent to client's property - Troy, MI
Phase II and preliminary hydrogeological investigation of methylene chloride-contaminated site - Madison Heights, MI
Phase III remedial investigation of heavy metal and volatile organic compound-contaminated soils and ground water - Warren, MI

ANDREW J. FOERG (Cont'd)

SAMPLING OF PROJECTS: (Cont'd)

Environmental Site Assessments (Cont'd)

Phase III to determine the delineation of heavy metal and trichloroethylene contamination at a production/painting facility - Warren, MI
Phase IV remedial and hydrogeological investigation of hexavalent chromium and halogenated volatile organic compound-contaminated soil and ground water. Included the design of an interim ground water treatment system with an activated carbon and ion exchange resin treatment system - Detroit, MI
Phase IV remediation of organic compound-contaminated soils - Roseville, MI
Phase I, II, III and IV of an illegal dumpsite on the bank of a river - Jackson, MI

Underground Storage Tank Management

Subsurface investigation, soil remediation, and hydrogeological investigation of a jet fuel underground storage tank farm - Canton, MI (MDNR approved)
Subsurface investigation and remediation of diesel fuel-contaminated soils at an underground storage tank site - Dearborn, MI (pending MDNR approval)
Development and implementation of remedial investigation work-plan - Wyandotte, MI (MDNR approved)

Hydrogeological Investigations

Remedial/hydrogeologic investigation of a large manufacturing facility with a multiple source, multiple compound-contaminated aquifer - Kalamazoo, MI

Ground Penetrating Radar Investigation

Suspected underground storage tank - Dearborn, MI
Void spaces adjacent to water pipe - Benton Harbor, MI
Investigation performed on the roof of a hospital to locate the building support columns - Flint, MI

GERALD M. BELIAN, P.E.

TITLE:

Executive Vice President

EDUCATION:

B.S., Civil Engineering
University of Notre Dame, 1963

PROFESSIONAL DEVELOPMENT:

Continual Development Through ACI, ASCE, MSPE, ESD, SMPS, PSMA, MAEP, and Others.
40-Hour Hazardous Waste Training Certification (OSHA)

LICENSES/REGISTRATION:

Registered Professional Engineer, State of Michigan, 1967
Registered Professional Engineer, State of Ohio, 1970
Registered Professional Engineer, State of Pennsylvania, 1970
Registered Professional Engineer, State of Florida, 1970
Registered Professional Engineer, State of Indiana, 1970

EXPERIENCE:

Over twenty-seven (27) years of consulting engineering and testing experience, specifically in Geotechnical, Environmental and Construction Materials Investigations including Testing, Inspection, Analysis, Project Management Supervision and Consulting.

SAMPLING OF PROJECTS:

Riverfront III - Detroit, MI
Michigan Bell Office Building - Detroit, MI
General Motors Poletown Assembly Plant - Detroit/Hamtramck, MI
University of Michigan Replacement Hospital Complex - Ann Arbor, MI
Wayne County Metropolitan Airport, Old Parking Structure Investigation - Romulus, MI
Prudential Town Center - Southfield, MI
Wayne County Metropolitan Airport, New Parking Structure Construction - Romulus, MI
Chrysler "Dodge City" Complex - Warren, MI
Detroit City Airport Expansion - Detroit, MI
ANR Harbortown - Detroit, MI
Selfridge ANG Base, Multiple Projects Over 20 Years - Mt. Clemens, MI
Cobo Hall Expansion - Detroit, MI
Joe Louis Arena - Detroit, MI
Chrysler Assembly Plant - Sterling Heights, MI
Palace of Auburn Hills - Auburn Hills, MI
St. John Hospital Addition and Parking Structure - Detroit, MI
TRW-VSSD Office Complex - Washington Township, MI

GERALD M. BELIAN, P.E. (Cont'd)

SAMPLING OF PROJECTS: (continued)

Detroit Trade Center - Detroit, MI
Mazda Assembly Plant - Flat Rock, MI
Laurel Park Office and Commercial Development - Livonia, MI
Travelers Tower II Office Building - Southfield, MI
Stroh Riverfront Complex - Detroit, MI
Chrysler Technology Center - Auburn Hills, MI
University of Michigan Kellogg Eye Center - Ann Arbor, MI
Fairlane Plaza (Ritz Carleton & Office Building) - Dearborn, MI
Wayne County Community College, Administration Building - Detroit, MI

TECHNICAL SOCIETY AFFILIATIONS:

American Concrete Institute	Member
American Public Works Association	Member
American Society of Civil Engineers	Annual Meeting Committee Chairman Professional Develoment Committee Chairman
American Society for Testing and Materials	Member
Engineering Society of Detroit	Construction Activity Committee Member
Great Lakes Fabrication & Erectors Association	Member
Michigan Association of Environmental Professionals	Member
Michigan Society of Professional Engineers	State Organization - Annual Meeting Committee (Past Chairman) Detroit Chapter - Annual Meeting Committee Chairman Past President Board of Directors (Past Member)
National Society of Professional Engineers	Member
Professional Services Management Association (Michigan Chapter)	Treasurer Board of Directors
Society of American Military Engineers (Detroit Chapter)	Board of Directors
Society of Marketing Professional Services (Michigan Chapter)	Treasurer Board of Directors

SCOTT M. CHANDLER

TITLE:

Laboratory Director
Analytical Services Department

EDUCATION:

B.S., Biology
University of Detroit, 1976

Selected Courses in Calculus/Physics and Organic Chemistry
Oakland University & Macomb Community College, 1983-1985

PROFESSIONAL DEVELOPMENT:

Analysis of Organic Pollutants Workshop,
University of Michigan, 1986
Gas Chromatography/Mass Spectrometry Workshop,
Extrel Corporation, 1985
Industrial Ventilation,
Michigan Department of Public Health, 1990
Industrial Hygiene Review Course,
University of Michigan, 1989

LICENSES/REGISTRATION:

Certified Industrial Hygienist; Comprehensive Practice;
American Board of Industrial Hygiene, 1990

EXPERIENCE:

Eleven (11) years experience in management and supervision of Environmental/Industrial Hygiene Laboratory. Responsibilities include development and implementation of written laboratory quality assurance plan, standard operations including interlaboratory proficiency studies; coordinating laboratory accreditation through American Industrial Hygiene Association; development of standard sampling and analytical procedures for volatile and non-volatile organics, metals and inorganics; development of laboratory air sampling capabilities for industrial solvents, formaldehyde and microorganisms; and development of laboratory gas chromatography/mass spectrometry capabilities. Senior Consultant for Environmental Contamination and Sick Building Syndrome projects.

TECHNICAL SOCIETY AFFILIATIONS:

American Industrial Hygiene Association
Michigan Industrial Hygiene Society

THOMAS W. KAUGHER, III

TITLE:

Senior Geologist
Environmental Assessment Department

EDUCATION:

B.S., Geology
Western Michigan University, 1988

PROFESSIONAL DEVELOPMENT:

40-Hour Hazardous Waste Training Certification (OSHA)
Ground Penetrating Radar Training

LICENSES/REGISTRATION:

Certified Nuclear Density Technician (Troxler)

EXPERIENCE:

Approximately four (4) years experience in performing and supervising environmental site assessment investigations, hydrogeological studies, soil and water sample collection and field analysis, soil-gas surveys, underground storage tank management, geophysical surveys utilizing Ground Penetrating Radar, remedial investigations and management, remediation system design and implementation and hazardous waste (Act 64) closures. Responsibilities include report writing and client consultation.

SAMPLING OF PROJECTS:

Environmental Site Assessments

- Phase I at 83 acres of undeveloped property prior to the construction of a new residential subdivision - West Bloomfield, MI
- Phase I of a plating facility - Detroit, MI
- Phase I and II at the site of a proposed residential subdivision - White Lake, MI
- Phase I and II of a former automobile dealership to determine if contamination from underground storage tanks was present - Detroit, MI
- Phase II to determine if contamination from underground storage tanks was present at a trucking and warehouse facility - Pontiac, MI
- Phase II and III around drum storage racks at a tool and die facility to determine if contamination was present and the extent of contamination - Warren, MI
- Phase III to determine the extent of heavy metal contamination at a former dumping area - Warren, MI
- Phase IV stratigraphic detailing and geotechnical analysis of subsurface soils to effectively design insitu vitrification of PCB contaminated soil at a large automotive manufacturing facility - Pontiac, MI

THOMAS W. KAUGHER, III (Cont'd)

SAMPLING OF PROJECTS: (Cont'd)

Environmental Site Assessments (Cont'd)

Background metals investigation at a construction equipment storage yard - Mt. Clemens, MI

Underground Storage Tank Management

Performed in-place closure of tanks at a marina - Grosse Pointe, MI
Monitored the removal of gasoline and heating oil tanks at a former state facility - Lapeer, MI
Monitored the removal of used oil tanks at an automobile dealership - Mt. Clemens, MI
Monitored the removal of a quench oil tank at a heat treating facility - Madison Heights, MI

Hydrogeological Investigations

Remedial/hydrogeological investigation to determine the extent of ground water contamination from underground storage tanks at a former construction facility - Livonia, MI
Investigation and monthly ground water sampling around an under-storage tank farm at a large automotive research facility - Warren, MI
Investigation to determine the level of elevated metals in the ground water at a former heat treating facility - Whittemore, MI
Investigation using the installation of deep wells into the aquifer at a shopping mall to determine if contamination from a former off-site dry cleaning facility had affected the subject property - Pensacola, FL

Ground Penetrating Radar Investigations

Investigation to locate the resteel and voids of a wall at a large automotive research facility - Auburn Hills, MI
Investigation to locate underground storage tanks at a bus and truck repair facility - Clio, MI
Investigation to identify areas of disturbed soils in conjunction with the search for a missing person - Warren, MI

Remediation Systems

Installed vapor extraction wells and performed a pilot test to remediate the remaining contamination in the soils at a former gasoline service station - Oak Park, MI (currently ongoing)
Installed permanent ground water monitoring wells and determined the ground water characteristics for the future installation of a pump and treat system at a former construction facility - Livonia, MI

TECHNICAL SOCIETY AFFILIATIONS:

American Association of Petroleum Geologists

WILLIAM J. HERCEG

TITLE:

Staff Scientist
Environmental Assessment Department

EDUCATION:

B.S., Resource Development
Michigan State University, 1983

PROFESSIONAL DEVELOPMENT:

40-Hour Hazardous Waste Training Certification (OSHA)
8-Hour Site Supervisor/Manager Health & Safety Course (OSHA)
Ground Penetrating Radar Training

LICENSES/REGISTRATION:

D-4 Waste Water Treatment Certification (MDPH)

EXPERIENCE:

Six (6) years experience in performing environmental site assessment investigations, hydrogeological studies, soil and water sample collection and field analysis, soil gas surveys, underground storage tank management, geophysical surveys utilizing Ground Penetrating Radar, remedial investigations and management, and hazardous waste (Act 64) closures. Responsibilities include report writing and client consultation. Experience also includes four (4) years experience in collecting samples from drums of unknown hazardous waste under Level B Personal Protection for the Environmental Enforcement Division of the Michigan Department of Natural Resources. Performed site investigations, record searches, interviews, and sample data research of environmentally-impaired sites prior to ranking for Act 307 funding and subsequent submittal for Hazard Ranking System CERCLA NPL ranking.

SAMPLING OF PROJECTS:

Environmental Site Assessments

Phase II - Abandoned paint facility - Wyandotte, MI
Phase II - Potentially-contaminated vacant property - Melvindale, MI
Phase II - Robotics and machining facility - Ferndale, MI
Phase II - Federal health facility - Saginaw, MI
Phase III - Existing tool and manufacturing facility to determine the extent of contamination - Taylor, MI

Underground Storage Tank Management

Monitored the tank removal and soil excavation - Detroit, MI
Monitored the tank removal and contaminated soil excavation at a radiator shop - Waterford, MI

WILLIAM J. HERCEG (Cont'd)

SAMPLING OF PROJECTS: (Cont'd)

Hydrogeological Investigation

Performed monitoring well survey and water level measurements at a vacant manufacturing facility - Whittemore, Michigan
Managed various CERCLA sites throughout the State of Michigan which entailed characterizing the containment constituency of affected aquifers, determining monitoring well depths and locations, and developing sampling plans. Performed aquifer characteristic tests, water level measurements, and ground water sampling programs.

Ground Penetrating Radar Investigation

Location of underground water lines at a state mental health facility - Garden City, MI
Location of an underground storage tank and piping runs at a plastic extrusion facility - Warren, MI

HUILING LI

TITLE:

Senior Hydrogeologist
Environmental Assessment Department

EDUCATION:

B.S., Hydrogeology
Hefei Polytechnical University, China, 1978

M.S., Applied Geophysics
Michigan Technological University, 1987

Ph.D., Geology
Michigan Technological University, 1991

PROFESSIONAL DEVELOPMENT:

40-Hour Hazardous Waste Training Certification (OSHA)

EXPERIENCE:

Thirteen (13) years experience in site explorations to define site stratigraphy and hydrogeological units, determination of aquifer transmissivity and storativity, groundwater surveys, soil and ground water remediation, ground water modeling, and subsurface exploration with geophysical methods such as electric resistivity and seimic reflection.

SAMPLING OF PROJECTS:

Environmental Site Assessments

Phase II field geological survey - Anhui Province of China
Phase II subsurface exploration with geophysical method for an oil company - China
Phase IV remediation of gasoline-contaminated soils - St. Clair Shores, Michigan
Phase IV remediation of gasoline-contaminated soils and ground water - Detroit, Michigan

Hydrogeological Investigations

Ground water survey - Anhui Province of China
Investigation and computer modeling - Hefei, China

TECHNICAL SOCIETY AFFILIATIONS:

American Geological Union

RONALD J. ZANGER

TITLE:

Quality Assurance Manager
Environmental Analysis Services

EDUCATION:

B.A., Chemistry
Western Michigan University, 1982

EXPERIENCE:

Ten (10) years experience total. Three (3) years experience in managing all aspects of Organic Laboratory operations. Six (6) years experience in applied organic and inorganic analysis of environmental samples for U.S. Environmental Protection Agency (EPA) Superfund project and contract management of data packages. Familiar with the development of instrumentation, laboratory procedures and quality assurance/quality control programs for gas chromatography (GC) and high pressure liquid chromatography (HPLC) analysis. Designed and implemented software for sample management, data reporting and statistical quality control charts. Experience includes quality control analyses related to animal toxicology studies in FDA-regulated facility.

METHODOLOGY/EQUIPMENT PROFICIENCY:

Expert in gas chromatography and high pressure liquid chromatography instrumentation operation, federal environmental regulations, and spreadsheet and word processor applications.

Experienced with gas chromatograph/mass spectrometer (GC/MS), atomic absorption (AA) and inductively coupled plasma spectrometer (ICP) operation, maintenance and repair.

Extraction procedure (EP) toxicity, toxicity characteristic leaching procedure (TCLP), and total metals extraction procedures.

Atomic absorption analysis of regulated elements in environmental matrices.

ICP analysis for regulated metals in soil, water, air and industrial waste samples.

Phenolics, nitrate and cyanide analysis by ultraviolet/visible spectroscopy.

Polychlorinated biphenyl (PCB) and semi-volatile organics extraction of soil, sediment, water and waste samples.

RONALD J. ZANGER (cont'd)

METHODOLOGY/EQUIPMENT PROFICIENCY: (cont'd)

Ion chromatography analysis for inorganic ions of air and water samples.

Gas chromatographic analysis of pesticides, herbicides, PCBs, volatile organics, pharmaceuticals, and other organic compounds for toxicological, environmental, and industrial hygiene projects.

HPLC analysis for environmental and Industrial Hygiene applications: isocyanates, PNA, MBOCA, and herbicides; in water, air, and soil samples; including method development and validation.

Pesticide and PCB analysis of environmental samples by Contract Laboratory Program (CLP) Statements of Work (SOW).

Volatile organic analysis (VOA) by GC for USEPA Special Analytical Services(SAS).

Validation of CLP organic and inorganic data for Superfund remediation projects in USEPA Region V.

Review and validation of Quality Assurance Project Plans for USEPA Region V Quality Assurance Office (QAO).

TECHNICAL SOCIETY AFFILIATIONS:

American Chemical Society
American Association for Advancement of Science

JOSEPH A. MONDRO

TITLE:

Senior Mass Spectroscopist
Environmental Analysis Services

EDUCATION:

B.S., Chemistry
Wayne State University, 1986

PROFESSIONAL DEVELOPMENT:

Environmental Applications Training for GC/MS,
Finnigan Institute, 1991

EXPERIENCE:

Six (6) years experience in methods development for analysis of environmental samples for organic contaminants in addition to development of sample extraction/clean up techniques.

METHODOLOGY/EQUIPMENT PROFICIENCY:

Pesticide/herbicide analysis of Extraction Procedure (EP) Toxicity and Toxicity Characteristic Leaching Procedure (TCLP) extracts by gas chromatography with electron capture detector (GC/ECD).

Analysis of semi-volatile and purgeable compounds by gas chromatography/mass spectroscopy (GC/MS).

Analysis of polynuclear aromatic hydrocarbons (PNAs) by gas chromatography (GC).

Polychlorinated biphenyl (PCB) extraction and analysis of transformer fluids and waste oils.

Volatile, semi-volatile, pesticide and PCB extraction techniques for sludges, soil, wastewater and TCLP extracts.

Analysis of charcoal sorbent tubes for halogenated and non-halogenated organic solvents.

Residual chlorine and total plate count analysis of drinking water.

Operation and maintenance of gas chromatograph and mass spectrometer instrumentation, and purge and trap concentrators and automated organics extraction equipment.

Quality control/quality assurance procedures development and maintenance for organics laboratory.

TECHNICAL SOCIETY AFFILIATIONS:

American Chemical Society

QUALITY ASSURANCE PROJECT PLAN (QAPjP)

DETREX - EATON AVENUE FACILITY
DETROIT, MICHIGAN
MID 091 605 972

U.S. EPA Region Permit Writer

U.S. EPA (MQAB)

TEC Project Manager

TEC Quality Assurance Manager

Testing Engineers & Consultants, Inc.
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08 October 1992

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QUALITY ASSURANCE PROJECT PLAN (QAPjP)

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPjP) outlines the procedures Testing Engineers & Consultants, Inc. will use to document all monitoring procedures, sampling, field measurements, and sample analyses performed during the investigation.

The investigation will characterize the environmental setting, source, and extent of contamination. The QAPjP is designed to ensure that all information, data, and resulting decisions are technically sound and statistically valid, as well as properly documented.

Quality Assurance (QA) is a system for ensuring that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented. Quality Control (QC) is the mechanism through which QA achieves it's goals. A QC program defines the frequency and methods of checks, audits, and reviews necessary to identify problems and dictate corrective action, thus verifying product quality. This QAPjP outlines project data quality objectives, sampling procedures, analytical procedures, quality control checks, and corrective action procedures.

The overall objectives of the QAPjP are to ensure that:

- All procedures used in data acquisition, analysis, and management do not detract from the quality of the results.
- Scientific data generated will be of sufficient quality to stand up to scientific and legal scrutiny.

.....continued

1.0 INTRODUCTION (Cont'd)

- Data will be gathered or developed in accordance with procedures appropriate for the intended used of the data.
- Data will be of known or acceptable precision, accuracy, representativeness, completeness, and comparability.

The objectives of quality assurance in the field are to ensure the validity and reliability of data acquired in the field by establishing an approved protocol for all field procedures, properly documenting all field activities, and training all field team members in the use of equipment, protocol, and documentation.

The computation objective of the QA/QC Plan is to provide accurate presentation and evaluation of data.

The QA plan ensures that the laboratory provides an adequate quality control program and includes:

- Documentation of analytical methods to be used;
- Documentation of equipment maintenance, testing, and calibration;
- An adequate documentation record system;
- Analysis of blank, duplicate, and spike samples.

2.0 PROJECT DESCRIPTION

2.1 Introduction

The objective of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) is to determine the nature and extent of releases from hazardous waste(s) or hazardous constituents from regulated units, solid waste management units, and other source

.....continued

2.1 Introduction (Cont'd)

areas at the facility, and to gather all the necessary data to support the corrective measures study.

The RFI will include a geotechnical and geological study of the facility area. The study will consist of soil borings, soil sampling, field analysis, laboratory analysis, data collection and analysis, and report generation.

2.2 Site Description

2.2.1 Location/Site

The Detrex facility is located at 12886 Eaton Avenue, in the City of Detroit, Michigan. The geographic location for this site is latitude 42° 23′ 5" and longitude 83° 10′ 22". A Site Location Map, indicating the location of the site as taken from the USGS Topographic Map, Royal Oak Quadrangle (1968, photo revised 1981), is presented in Attachment 1.

The site is somewhat wedge-shaped, measuring approximately 225.0 feet (north to south) on the east border, and tapering to a point (bordered by the railroad trade easement and Eaton Street) on the west (approximately 285.0 feet from the east property line). The total site area is approximately .9 acres.

2.2.2 Borders

The property is bordered to the north and west by a railroad easement; to the south by Eaton Avenue; and to the east by the Detroit

.....continued

2.2.2 Borders (Cont'd)

Non-Ferrous Foundry, Inc. The zoning for the subject property and the property to the east is M-4, Intensive Industrial. The remaining areas are zoned R-1, Residential. The borders are depicted in Attachment 2.

2.2.3 Legal Boundaries

A copy of the most recent legal survey of the property owned by the Detrex Corporation, along with the legal description, is provided in Attachment 2. The survey map shows all buildings, utilities, paved areas, easements, and right-of-ways.

2.2.4 Important Physical Features

Attachment 2 indicates all of the important physical features of the site and their locations. The primary features are:

- 100' x 225' gravel area on the east side;
- Loading/unloading area west of gravel area;
- Main building west of loading/unloading area;
- Above ground storage tanks (ASTs) west of north half of main building;
- Office area south of ASTs;
- One-story cinder block building on west end of property.

The Detrex facility in Detroit is located on the flat, lacustrine plain. Very little topographic relief exists close to the facility. The area is interrupted only by major drainage channels and the marking of former beaches of glacial lakes.

.....continued

2.2.4 Important Physical Features (Cont'd)

The lands immediately surrounding the facility are at an approximate elevation of 656 feet above mean sea level (AMSL). The building floor, which forms the base of the secondary containment areas, is at an elevation of approximately 659 feet AMSL.

To the west of the facility, one railroad track moves in a northeast direction. One railroad spur enters the property directly north of the facility building. The elevation of the spur is approximately 656 feet AMSL. A topographic map is provided in Attachment 2.

2.2.5 Geology

2.2.5.1 Regional Geology

The main overburden material in Wayne County consists primarily of silts and clays, with the occasional glacial moraine deposits. This thick layer of lacustrine material mantles a bedrock of sandstones, limestones, shales, and dolomites. The downward sequence of the various bedrock formations beneath Wayne County includes the following:

Mississippian

- Coldwater Shale - This unit exists at the northwest corner of Wayne County. The unit outcrops and subcrops in this area. The unit generally has low permeability.

Devonian

- Berea Sandstone - This moderately fine-grained sandstone can be 100 feet in thickness in spots.

.....continued

2.2.5.1 Regional Geology (Cont'd)

- Traverse Group - This alternating sequence of shales and limestones outcrops in the central portions of Wayne County.
- Dundee Limestone - This unit is a fossiliferous limestone with high permeability.
- Detroit River Group - This group includes sandstones, limestones, and dolomite.
- Sylvania Sandstone - This unit outcrops in the southeast reaches of Michigan.

Silurian

- Bass Leland Group - This group is composed of fine-grained dolomites.

Of the formations listed above, the following formations are reported to be used as a water supply source in Wayne County: Berea Sandstone, Traverse Group, Dundee Limestone, Detroit River Group, and the Sylvania Sandstone.

Several injection wells are located within Wayne County. Six Class I injection wells are used to inject industrial, nuclear, or municipal wastes beneath the deepest stratum containing an underground drinking water source. Eight injection wells, used for injecting fluids for solution mining, oil shale gasification, or geothermal energy recovery, are also reported for Wayne County. Thirty wells are reported to be used for liquefied petroleum gas storage. No brine injection wells are recorded in Wayne County.

.....continued

2.2.5.2 Local Geology

Based on boring logs generated during previous on-site studies [background soil and ground water data collection program (07/91) and supplemental sampling activities (12/91)], the local geology can be described as follows:

A brown to gray medium-grained sand with gravel (fill) from the surface to approximately 3.5 to 4.5 feet is underlain by 1.0 foot of fine sand with some clay, which is underlain by blue/gray to approximately 97.0 feet below grade. A wet sand is encountered at 97.0 feet extends to approximately 111, feet which is the termination depth of the deepest boring to date. Boring logs are included in Attachment 4.

2.2.5.3 Hydrogeology

Based on the available site specific information, it appears that a saturated zone was encountered in boring BH8A-91 at approximately 4.0 feet below grade at the upper surface of a relatively thin, medium to course grade zone. This boring also encountered concrete from approximately 2.0 to 4.0 feet below grade. Several other borings encountered a similar sand layer; however, it was not saturated. It is apparent that the water encountered in BH8A-91 is anomalous and does not represent an aquifer or an extensive zone of perched water.

The first true water boundary zone aquifer was encountered at a depth of approximately 97.0 feet. The aquifer is comprised of a fine to coarse gray sand with gravel, and extends to a minimum depth of

.....continued

2.2.5.3 Hydrogeology (Cont'd)

111 feet below grave (termination depth of BH-MW1-89). Because only two monitoring wells have been installed to date, no ground water flow direction has been determined. The static water level in BH-MW1-89 is approximately 51.0 feet below grade. Boring logs are included in Attachment 4.

2.3 Site Background

2.3.1 History

The Eaton Avenue facility has been owned and operated by Detrex since 1950. The Eaton Avenue facility specializes in the sale of halogenated solvents and the recovery (recycling) of spent solvents. Spent solvents are collected from such industries as: the metal working industries that clean machined and stamped parts in vapor degreasing equipment; rubber molding operations where defective parts are solvent removed from metal inserts; the electronic industry where circuit boards and other components are cleaned and defluxed in batch and continuous conveyor-type solvent defluxing; and industries that spray paint on an assembly line basis where the hangers and conveyor components are cleaned with solvents in on-line vapor degreasers. The facility operates under Environmental Protection Agency (EPA) Identification Number MID 091 605 972. The Standard Industrial Classification (SIC) Codes for the facility are 2869 and 5161.

The source(s) of the Volatile Organic Compound (VOC) contaminated soils which are the subject of this investigation have not been

.....continued

2.3.1 History (Cont'd)

identified. The following list identifies potential sources which may have caused or contributed to the contamination:

- One spill incident was recorded at the facility. In March 1990, a railroad tank car leaked approximately ten gallons of still residue which contained trichlorethane. Approximately ten yards of soil was excavated from the spill area;
- Past operating practices at the Eaton Avenue facility;
- Historical contamination prior to Detrex ownership;
- Contaminated fill materials transported to the site for construction purposes;
- The migration of contamination from adjacent or nearby facilities.

2.3.2 Previous Sampling and Analysis Programs

Previous investigations have been undertaken at this site and are the basis for the proposed RFI described in this plan. Three specific data collection activities have been completed to date and include:

- Hydrogeological Investigation - April 1989
- Background Soil and Ground Water Data Collection Program - Conestoga-Rovers Associates (CRA) - September 1991
- Supplemental Sampling Activities - Background Soil and Ground Water Data Collection Program - Conestoga-Rovers Associates (CRA) - December 1991

2.3.2.1 Summary of Hydrogeological Investigation

Available documents indicate that this study included the drilling of three soil borings; BH-MW-1-89, BH2-89, and BH3-89. Boring locations are indicated in Attachment 2.

.....continued

2.3.2.1 Summary of Hydrogeological Investigation (Cont'd)

BH-MW1-89, located east of the building, was completed as a monitoring well and defines the uppermost aquifer and ground water elevation beneath the facility.

The borehole was advanced using 4 1/4 inch inside diameter (ID) hollow-stem augers to a depth of 60.0 feet below the ground surface. At this depth, auguring became inefficient due to the clay rich sediment. The drilling method was then switched to mud rotary using a 3 7/8 inch tricone drilling bit.

Continuous samples were collected for subsequent geotechnical analysis from ground surface to 30.0 feet below grade using precleaned, 2 inch diameter, stainless steel split-spoons. Soil samples were than collected at 5.0 foot intervals until the uppermost aquifer was encountered at a depth of 99.0 feet below the ground surface. Two shelby tubes were also collected from this borehole for vertical permeability analysis at depths of 30.0 to 32.0 feet and 54.0 to 56.0 feet below grade. Perched ground water was not encountered during drilling.

Upon completion of the borehole, a monitoring well was installed approximately 12.0 feet into the sand aquifer at a depth of 111 feet below the ground surface. The well was constructed of 10.0 foot, 0.010 inch slotted, Schedule 80, 2 inch diameter flush-threaded PVC, jointed to 2 inch diameter, Schedule 80, flush-threaded PVC riser pipe. A sand pack of quartz sand (No. 20) was placed around and 20.0 feet above the well screen. A 5.0 foot bentonite pellet seal was

.....continued

2.3.2.1 Summary of Hydrogeological Investigation (Cont'd)

placed over the sand pack. The remaining annulus was tremie grouted to the surface with a bentonite/cement grout. The well was completed below grade with a lockable cap and flush-mounted protective casing.

A stratigraphic and instrumentation log from BH-MW1-89 is provided in Attachment 4.

2.3.2.2 Background of Soil and Ground Water Data Collection Program

Six soil borings were performed during this study (BH1-91 through BH6-91). Their locations are indicated in Attachment 3. BH1-91 through BH4-91 were advanced to a total depth of 10.0 feet below the ground surface. BH5-91 and BH6-91 were advanced to a total of 14.0 and 16.0 feet below the ground surface, respectively. Perched ground water was not encountered during drilling. Selected soil samples were submitted to Research Technology International (RTI) for chemical analysis of VOCs.

On 16 August 1991, the on-site ground water well (MW-BH1-89) was purged and sampled. The well's potentiometric surface, prior to well purging, was measured at 606.55 feet AMSL. This compares to 605.18 feet AMSL recorded during original well installation in April 1989.

.....continued

2.3.2.2 Background of Soil and Ground Water Data Collection Program (Cont'd)

With the indication of the potential presence of VOCs within the ground water aquifer, a decision was made to conduct more extensive well development/purging, followed by resampling, in order to confirm the results.

A submersible pump was initially utilized during the second sampling event to increase the rate and volume of water purged prior to sampling. The original purging had been completed using a bailer and nylon rope. Shortly after initiating pumping with the submersible pump at a pumping rate of approximately 2 gallons per minute, a severe silt presence in the water was encountered which plugged the pump and prevented purging. An attempt to clean the silt from the well utilizing an air-lift pump was unsuccessful. Subsequently, a jetting tool was constructed and utilized which successfully cleaned the silt out of the well. The jetting tool consisted of a hose from a potable water supply attached to 110 feet of 1/2 inch diameter PVC rigid piping. A "T" fitting was attached to the surface of the well casing to direct purge water into the adjacent containment system for the transfer facility.

A record was maintained of water injected into the well and water collected within the containment system to estimate potential water loss to the formation. An estimated total of 135 gallons was initially lost to the formation during purging. Subsequently, a submersible pump was used to purge the well again, prior to resampling. During the purging, substantial quantities of silt were

.....continued

2.3.2.2 Background of Soil and Ground Water Data Collection Program (Cont'd)

again encountered which plugged the submersible pump. Further attempts to clean the monitoring well by alternately removing silt (using the jetting tool) and purging (using the submersible pump) were unsuccessful.

On 18 September 1991, further attempts to purge and resample the monitoring well were suspended. Throughout the well purging program, a total net loss of water to the formation of approximately 60 gallons was recorded.

The results of the report entitled "Background Soil and Ground Water Data Collection Program" indicate a limited VOC presence within the sand fill and upper clay formation in the vicinity of the loading/unloading area. The additional soil sampling indicates that the chemical presence within the clay formation does not extend very deep. The distribution of VOC presence indicates a significant reduction of VOC concentration with depth in the clay formation.

2.3.2.3 Summary of Supplemental Sampling Activities

This study was conducted pursuant to the results of the report entitled "Background Soil and Ground Water Data Collection Program". The supplemental sampling activities included the completion of four borings (BH7-91 through BH10-91), the installation of one monitoring well (BH7-91), and the collection of soil and ground water samples for chemical analysis.

.....continued

2.3.2.3 Summary of Supplemental Sampling Activities (Cont'd)

The results of the supplemental sampling activities indicate a limited VOC presence in the upper fill material and the upper portion of the underlying clay formation. VOCs were not detected in soils at depths in BH7-91, nor in ground water from BH-MW2-91.

2.4 Target Compounds

Based on the results of the supplemental sampling activities, no further investigation of ground water is proposed, and therefore, target compounds in ground water are not applicable. The target compounds for soil are listed in Table 1.

TABLE 1

Methylene Chloride	1,2 dichlorethene	Toluene
1,1 dichloroethane	1,1,1 trichloroethane	Ethylbenzene
1,2 dichloroethane (total)	1,1,2 trichloroethane	Xylenes (total)
1,1,2,2 tetrachloroethane	Tetrachloroethene	Chloroform

Required detection limits will adhere to Contract Laboratory Program (CLP) contractually required detection limits. The limits are presented in Appendix H of Data Quality Objectives for the Remedial Response Activities (EPA/540/G-87/004).

.....continued

2.5 Project Objective

2.5.1 Objectives

The objectives of the RFI activities are to:

- Determine presence or absence of contaminants at source and in all pathways;
- Determine types (nature) of contaminants at source and in all pathways;
- Determine concentrations of contaminates in order to establish concentration gradients;
- Determine directions of pathways transport;
- Determine boundaries of source and pathways on-site.

2.5.2 Data Usage

The types of data proposed to be collected during the RFI are correlated to the intended data usage in this section.

Data collected from qualitative or semi-qualitative analysis [primarily HNU photoionization detection (PID)] will be used for health and safety monitoring during implementation of the field portion of the RFI and selection of samples for laboratory analysis. Data collected for geotechnical analysis will be used to evaluate the physical characteristics of the soils in order to determine potential remedial options. Data collected from the laboratory analysis of chemical compounds will be used for determination of the horizontal and vertical extent of on-site soil contamination, detection of the concentration gradients, determination of the source(s) and migration pathways, and evaluation of remedial action alternatives. In

.....continued

2.5.2 Data Usage (Cont'd)

addition, laboratory analytical data will be utilized for determination of hazardous waste characteristics to evaluate the feasibility of excavation as a remedial action alternative.

2.5.3 Data Quality Objective Summaries

A Data Quality Objective Summary is included in Attachment 5.

2.6 Sample Network and Rationale

Grid Intervals - The grid intervals for placing soil borings are based on 40.0 foot spacing across the site. The rational for using the 40.0 foot grid interval to select the sampling locations is based on the Michigan Department of Natural Resources (MDNR) Guidance Document for Verification Sampling. This grid interval was modified when building or structures were encountered. The initial sampling will not include borings within any structures. The intervals were then biased in a manner such that areas where overspills may have occurred would not be missed.

Depth of Sampling - Borings will be advanced to 20.0 foot depths due to previous investigations finding no contamination below the 15.0 foot depth.

2.6.1 Sampling Intervals

Sampling intervals will occur every 2.5 feet. The rationale behind this interval is based on previous borings determining that

.....continued

2.6.1 Sampling Intervals (Cont'd)

three soil types exist in the stratigraphic coloumb, and it is the intent of this strategy to collect at least one sample from each soil type from each boring location.

2.6.2 Sampling Frequency

For VOC analysis, each sample will be screened using a field instrument. From each boring, the highest PID reading for a specific soil type will be analyzed in the laboratory. It is the intent that using this method for frequency of collection will determine the extent and concentration of contaminants in each soil type. If, on a single boring for a specific soil type, no PID readings are registered, the PID readings for the same soil type from neighboring soil borings will be used to determine analytical analysis.

2.6.3 Sample Location Rationale

The sample locations described in the previous section were selected to provide sufficient data to meet the objectives of the RFI. The locations are based on the data collected during the previous studies of the Eaton Avenue facility. See Attachment 6 for proposed boring locations.

2.6.4 Sampling Summary

Table 2 lists the proposed matrix parameters and collection frequency.

.....continued

2.6.4 Sampling Summary (Cont'd)

TABLE 2

Matrix	Parameters	Frequency
Soil	VOCs (Lab)	Minimum 1/per boring Maximum 3/per boring
Soil	VOCs (HNU PID)	Each boring/every 2.5'
Soil	Geotechnical (Gravity Tile, Atterberg Limits, Permeability, and Porosity)	One per soil horizon
Air in Breathing Zone	VOC (HNU PID)	Every 10 minutes during drilling or as needed

2.6.5 Other Analytical

It is the intent of the investigation to obtain pH, moisture content, and carbon content from each soil horizon for future reference.

2.7 Project Schedule

The schedule to complete the RFI is outlined below. The start date of the schedule is 27 September 1992. This is 90 days from the date the permit was issued. For the purposes of this schedule, the EPA/MDNR reviews will be assumed to take four weeks. Deviations from this assumption by the EPA/MDNR will not affect the time duration required for Testing Engineers & Consultants, Inc. to complete the required task, and therefore, the schedule will only be offset the additional time it takes the EPA/MDNR to complete their reviews. Following the review of the RFI Workplan, the schedule will adhere to

.....continued

2.7 Project Schedule (Cont'd)

the time stated by the permit for resubmittal of the workplan (60 days). Upon approval of the workplan, the implementation of the RFI will begin within 30 days (also stated in the permit). The Field Investigation Team will require one week of on-site work to complete the proposed drilling and sample collection procedures. Laboratory analysis will require two weeks to obtain final results. Validation will require an additional three days for QA Manager review. Investigation analysis will require two weeks, and an additional week of report preparation will be required.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITY

3.1 Management Responsibility

The RFI is being conducted for Detrex Corporation by Testing Engineers & Consultants, Inc., of Troy, Michigan, with the approval and oversight by the MDNR and the EPA (Region V). All workplans, data collection plans, quality assurance plans, and reports will be based on the RFI (Attachment I) that was submitted with the Detrex permit.

The Project Manager will be directly responsible to Detrex Corporation and will maintain communication with the MDNR and U.S. EPA as necessary.

The Quality Assurance (QA) Manager is directly responsible to the Project Manager, who has ultimate responsibility for quality assurance of the project. The QA Manager is responsible for conducting staff training in QA procedures and requirements; internal, system, and

.....continued

3.1 Management Responsibility (Cont'd)

performance audits; and for identifying and implementing corrective actions.

The Health and Safety Coordinator also is directly responsible to the Project Manager. The Health and Safety Coordinator has the responsibility to properly train the field crew and any subcontractors in appropriate health and safety techniques, including field instrument use, protective clothing use, and decontamination procedures. The Health and Safety Coordinator will conduct field audits and oversee the on-site Health and Safety Officer.

The investigation generally is divided into four categories; site investigations, laboratory analysis, investigation analysis, and reporting. Site investigations include all field activities such as research, test borings, stratigraphy characterization, and soil sampling. The field crew will consist of a Site Manager, Health and Safety Officer, Field Geologist, and Drill Rig Operator and Assistant, as required.

Laboratory analysis includes physical and chemical analysis. Both physical and chemical analysis will conducted by Testing Engineers & Consultants, Inc.

Investigation analysis includes data reduction, validation, and evaluation. Procedures for these activities are provided in the Data Management Plan and Quality Assurance Project Plan (QAPjP).

.....continued

4.0 QUALITY ASSURANCE OBJECTIVES

Samples from this site have been previously analyzed by two different laboratories, and reservations may exist with respect to validity and accuracy of this data. The intent of the present contracting laboratory is, therefore, to attain a relatively high level of data precision accuracy and completeness demonstrably equal to or superior to previous analyses, equivalent to Level V described in "Data Quality Objectives for Remedial Activities (Development Process)", EPA 540/G-87/003, March 1987. Because previous analyses appear to have been produced without benefit of a project plan or specific provisions for data quality, no comparability of previous data with analyses performed under this project plan should be expected.

Specific analytical acceptance limits and the means to achieve these are described in the Statement of Work (SOW). See Section 8.0, Analytical Procedures.

5.0 SAMPLING PROCEDURES

5.1 Introduction

This plan has been prepared to outline the sampling procedures that Testing Engineers & Consultants, Inc. will be following during the environmental testing at the Detrex facility. The plan addresses procedures for sample collection and documentation.

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5.2 Sample Collection

The following section describes the procedures for the soil and ground water sampling that will be performed.

5.2.1 Soil Sampling

The following section describes the procedures for soil sampling.

5.2.1.1 Surveying

Where applicable, a grid system will be established over the study area to determine sampling locations. The number of sampling points will be proportioned to the size of the study area. Where possible, sampling locations will be surveyed by SEG Land Surveyors.

5.2.1.2 Hand Auger Sampling

The following procedure will be followed if hand augering is to be performed on-site.

Soil samples will be collected using a stainless steel hand auger. Collected samples will be transferred from the auger to the appropriate container using a stainless steel spoon. Stones, twigs, and vegetation will be removed from the collected sample.

Each borehole will be backfilled using cuttings generated during hand augering. Each hole will be backfilled with the cuttings generated during the augering of that specific hole.

All sampling devices will be decontaminated prior to each sample's collection. Decontamination will consist of washing the

.....continued

5.2.1.2 Hand Auger Sampling (Cont'd)

sampling device with non-phosphorus detergent and triple rinsing with deionized water. Decontamination waste will be containerized and properly disposed.

Sample documentation, preservation, and handling will be performed in accordance with the procedures outlined in Sections 5.3 and 5.4 of this plan.

5.2.1.3 Hollow-stem Auger Sampling

The following procedures will be followed for the site described in the workplan which designates soil sample collection by hollow-stem auger method.

The soil samples will be collected by advancing helical hollow-stem augers into the ground using a truck-mounted drilling rig. Samples will be recovered at the specified depth intervals using a split-spoon sampler following the procedures described in ASTM Specification D-1586.

Collected samples will be transferred from the split-spoon sampler to the appropriate container using a stainless steel spoon. Large stone, twigs, and vegetation will be removed from the collected sample.

Hollow-stem augers and split-spoon samplers will be decontaminated prior to the drilling of each boring. Decontamination will consist of steam cleaning the equipment.

.....continued

5.2.1.3 Hollow-stem Auger Sampling (Cont'd)

All sampling devices will be decontaminated prior to each sample's collection. Decontamination will consist of washing the sampling device with non-phosphorus detergent and triple rinsing with deionized water. Decontamination waste will be containerized and properly disposed.

Each borehole will be backfilled. Backfill material will be a bentonite/cement slurry.

Sample documentation, preservation, and handling will be performed in accordance with the procedures outlined in Sections 5.3 and 5.4 of this plan.

5.3 Sample Packaging, Handling, and Shipment

Water samples, in 40 ml vials, are taken in duplicate, sealed in zip-lock bags (two vials, one sample, one bag), and placed in the shipping container. Each soil sample is placed in a single jar, closed, sealed in a zip-lock bag (one per sample), and placed in the shipping container. Freezer packs are placed with the samples to fill about ten to fifteen percent of the interior space of the container. All are covered with clean vermiculite, and the container is closed and sealed with clear packing tape. A label is affixed to the top of the shipping container to indicate the contents. Shipping containers are then hand delivered to the laboratory by a member of the sampling team on the same day the samples are taken.

.....continued

5.3 Sample Packaging, Handling, and Shipment (Cont'd)

Site samples will be soils, exclusively, but trip blanks and field blanks will be water samples, and provision is made for both types.

Sample containers for water samples are 40 ml clear borosilicate glass (precleaned by the manufacturer) and closed with open-top black phenolic caps with Teflon-lined silicone liners (catalogue number 225300) from Wheaton, 1501 North Tenth Street, Millville, New Jersey 08332, (800) 225-1437.

Soil sample containers are from Troy Scientific Corporation, 3693 East Ten Mile Road, Warren, Michigan 48091, (313) 755-5151. These are four ounce flint glass jars with separate Teflon liners for the closures. Liners, closures, and jars are precleaned by the sample custodian by washing with hot tap water and laboratory-grade non-phosphate detergent (Alconox), rinsed three times with ASTM Type I deionized water, and oven dried at 105^{o} C in a clean laboratory oven for two hours and allowed to cool. Liners are then placed in the closures, placed on the jars by the sample custodian while equipped with Polyvinyl Chloride laboratory gloves, and placed in marked boxes in the laboratory field supply shelves.

Soil and water samples are maintained at a temperature of 4^{o} C from the time they are collected to the time they are analyzed. Water samples for this project are trip blanks and field blanks (decontamination rinses) and require no additional preservation. Trip blank samples consist of ASTM Type I deionized water in 40 ml vials, prepared by the sample custodian on demand by the field sampling team

.....continued

5.3 Sample Packaging, Handling, and Shipment (Cont'd)

on the day of each sampling event. One trip blank, in duplicate, is prepared for each sampling event and is acquired from the laboratory no more than twenty-four hours in advance of the sampling event.

Holding times are fourteen days from verified time of sample receipt (VTSR) for both soil and water samples. See Section 5.4.4, Chain-of-Custody Procedures.

5.4 Sample Documentation

Each collected sample will be documented through the use of field forms and soil boring logs. These forms are provided in Attachment 7. The forms ensure comprehensive documentation of the field procedures and observations.

5.4.1 Field Forms

Soil sampling procedures will be documented using a field form (Attachment 5). Information on the field form includes site location, date and time of sampling, decontamination procedures, and sample description.

5.4.2 Soil Boring Logs

Lithologies encountered during drilling will be documented using a soil boring log (Attachment 7). Boring logs will be completed by a qualified geologist. Information recorded on the soil boring log includes lithology type and depth encountered, sampling interval, blow counts, sample recovery, and interval PID readings.

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5.4.3 Sample Labeling

Specific sample labeling procedures are necessary to prevent misidentification of samples. Sample labeling will include project name, sample identification number, name of sampler, parameter(s) to be analyzed, preservatives, and sampling date and time.

5.4.4 Chain-of-Custody Procedures

A representative of the sampling team will hand deliver samples to the laboratory sample custodian, who will issue a Chain-of-Custody (COC) form (Attachment 8) for completion by the sampling representative. The COC will indicate the method of preservation and compliance with preservation protocol, and will include the date and time of the custody transfer. The time and date indicated will be the VTSR, from which time compliance with holding time criteria will be evaluated. The names of the sample custodian and the sampling representative will be printed on the COC form, and each will sign the COC when the form is completed. A copy of the COC will be provided to the sampling representative. A copy of the field sampling record will be provided to the sample custodian, Quality Assurance Office, and the department supervisor.

The serial number of the COC and the serial number of each sample will be issued at the VTSR and assigned sequentially from the last COC and sample numbers issued by the sample custodian. Each COC number and each sample number is a five digit number, and each is unique and distinct from all other COC numbers and sample numbers. The sample number is designated by association with a unique identifier provided

.....continued

5.4.4 Chain-of-Custody Procedures (Cont'd)

by the sampling team, and appearing on a label attached to the sample container. The sample custodian will attach a label to the sample container indicating the sample number. A description of the sample set, including the COC number and the number of each sample, will be recorded in the laboratory sample log. The samples are placed in a box labeled with the COC number, sample numbers, and a client name, and placed in a refrigerator provided with a lock which is assessable only to the sample custodian, analyst, Quality Assurance Office, and department supervisor.

An assignment (attached) is generated from the sample log by the sample custodian and includes the client name, COC number, serial number, and a summary description of each of the samples, as well as the log-in date and due dates for the analysis and analytical report. The assignment sheet is relinquished to the department supervisor who assigns the analysis and transfers custody of the samples to the analyst by indicating the analyst name and assignment on the assignment sheet. The samples remain in the custody of the analyst until they are scheduled for disposal, which will be six months after the data submission. The date of sample disposal is noted in the laboratory sample log.

6.0 QUALITY CONTROL

Quality control procedures will be performed to document the accuracy and precision of the sampling and analyses. Quality control procedures will include field and laboratory programs.

.....continued

6.1 Field Program

Quality control procedures which will be implemented during sampling will include trip blanks, field blanks, and duplicates.

6.1.1 Trip Blanks

One trip blank will be collected for each sampling event to detect any potential contamination due to the sampling containers or sample transport. A trip blank involves filling sample containers with reagent grade water and transporting the containers with the sample containers used for field samples. The trip blank is submitted with the samples for laboratory analyses.

6.1.2 Field Blanks

One field blank will be collected during each sampling event to detect any potential contamination from the sampling equipment or airborne particles. A field blank involves passing reagent grade water through each type of sampling device and into sample bottles in the field at the time of sample collection. The field blank will be collected at anytime after the first field sample is obtained. The field blank is submitted with collected samples for laboratory analyses.

6.1.3 Duplicates

One duplicate sample will be collected for every ten sampling points during the soil sampling to document concentration variations. The duplicates will be submitted with the samples for laboratory analyses.

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7.0 CALIBRATION PROCEDURES AND FREQUENCY

7.1 Field Instrument

The PID will be calibrated daily using manufacturer supplied calibration span gas.

7.2 Laboratory Instruments

Analytical calibration procedures and frequency are completely described in the SOW. See Section 8.0, Analytical Procedures.

8.0 ANALYTICAL PROCEDURES

The analytical procedures used will be the U.S. EPA Contract Laboratory Program Statement of Work for Organic Analysis, MultiMedia, Multi-Concentration, Document Number OLM01.8, August 1991 revision, with two exceptions: (1) no tentatively identified compounds (TICs) will be reported and no TIC form provided, as all analytes of interest are represented on the Target Compound List; and (2) no computer-readable disk deliverables will be provided, as Computer-Aided Data Review and Evaluation (CADRE) will not be used.

9.0 INTERNAL QUALITY CONTROL CHECKS

9.1 Laboratory Analyses

Internal QC checks are provided for laboratory analyses through the requirements of the CLP SOW protocols and internal laboratory protocols. CLP SOW specifications for instrument calibration, surrogate recoveries, and other analytical QC criteria are assessed on a daily basis by instrumental analysts and by the Laboratory

.....continued

9.1 Laboratory Analyses (Cont'd)

Supervisor and Quality Assurance Manager on a project-by-project basis. Analysts are required to notify the Laboratory Supervisor on short notice of any instance of non-compliance. The Laboratory Supervisor makes the initial determination of the effect on the data, (including holding time compliance) and makes the decisions as to action to correct analytical difficulties (such as switching to another instrument, repreparation of analytical standards, or arrangements for equipment repair). Descriptions of all instances of non-compliance and instrumental difficulties are documented in laboratory records, including instrument run logs and laboratory notebooks, and is overseen by the Laboratory Supervisor and audited by the Quality Assurance Manager.

The Quality Assurance Manager is notified in the event of serious instances of non-compliance, and further recommendations are made for corrections. At the discretion of the Quality Assurance Manager, notification and documentation of difficulties may be required in writing and are subject to distribution to Laboratory Management. All client data is audited by, and subject to the approval of, the Quality Assurance Manager.

10.0 DATA REDUCTION, VALIDATION, AND REPORTING

10.1 Data Reduction

Methods used for reducing laboratory data are described in the instrumental data system manual and are performed to meet the specifications of the SOW.

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10.2 Data Validation

Data validation will be performed by the Quality Assurance Manager using the U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, Multi-Media, Multi-Concentration, Draft (November 7, 1989), with modifications to reflect the acceptance criteria reflected in the more recent SOW. Computer-Aided Data Review and Evaluation (CADRE) will not be available and will not be used. A form summarizing calibration outliers will be provided. A narrative will also be provided noting compliance and instances of non-compliance with the acceptance criteria specified in the SOW, and the effect of any analytical non-compliance on the data.

10.3 Data Reporting

The format for reporting data is completely described in the SOW, with the exceptions noted in Section 8.0, Analytical Procedures. A list of deliverables from the laboratory will be submitted with the evidence file including, but not limited to, the field sampling record, the laboratory COC form, assignment sheet, analytical data package, and data review and validation narrative. The evidence file is ultimately relinquished to the Project Manager by the Quality Assurance Manager.

11.0 PERFORMANCE AND SYSTEM AUDITS

See Section 9.0, Internal Quality Control Checks.

.....continued

12.0 PREVENTIVE MAINTENANCE

12.1 Laboratory Instruments

Preventative maintenance of the gas chromatograph/mass spectrometer system that will be used for the analysis of these samples is provided through the manufacturer's service contract on a quarterly basis. Provision is also made for daily inspection of overall instrument performance through routine system checks, including tuning and calibration. Selections of spare parts for the purge-and-trap system, gas chromatograph, mass spectrometer, and data system are well established and maintained by laboratory personnel.

13.0 SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA PRECISION, ACCURACY, AND COMPLETENESS

Specifications for the assessment of data quality for this project are described in Section 10.2, Data Validation. Other procedures are described in Section 9.0, Internal Quality Control Checks, which includes Performance and Systems Audits.

14.0 CORRECTIVE ACTION

The Quality Assurance Manager is responsible for the development and enforcement of the Corrective Action Plan. Responsibility for implementing Corrective Action Plans resides primarily with the Laboratory Supervisor and with individual analysts, as delegated. Procedures for implementing corrective action is described in Section 9.0, Internal Quality Control Checks, which includes Performance and Systems Audits.

.....continued

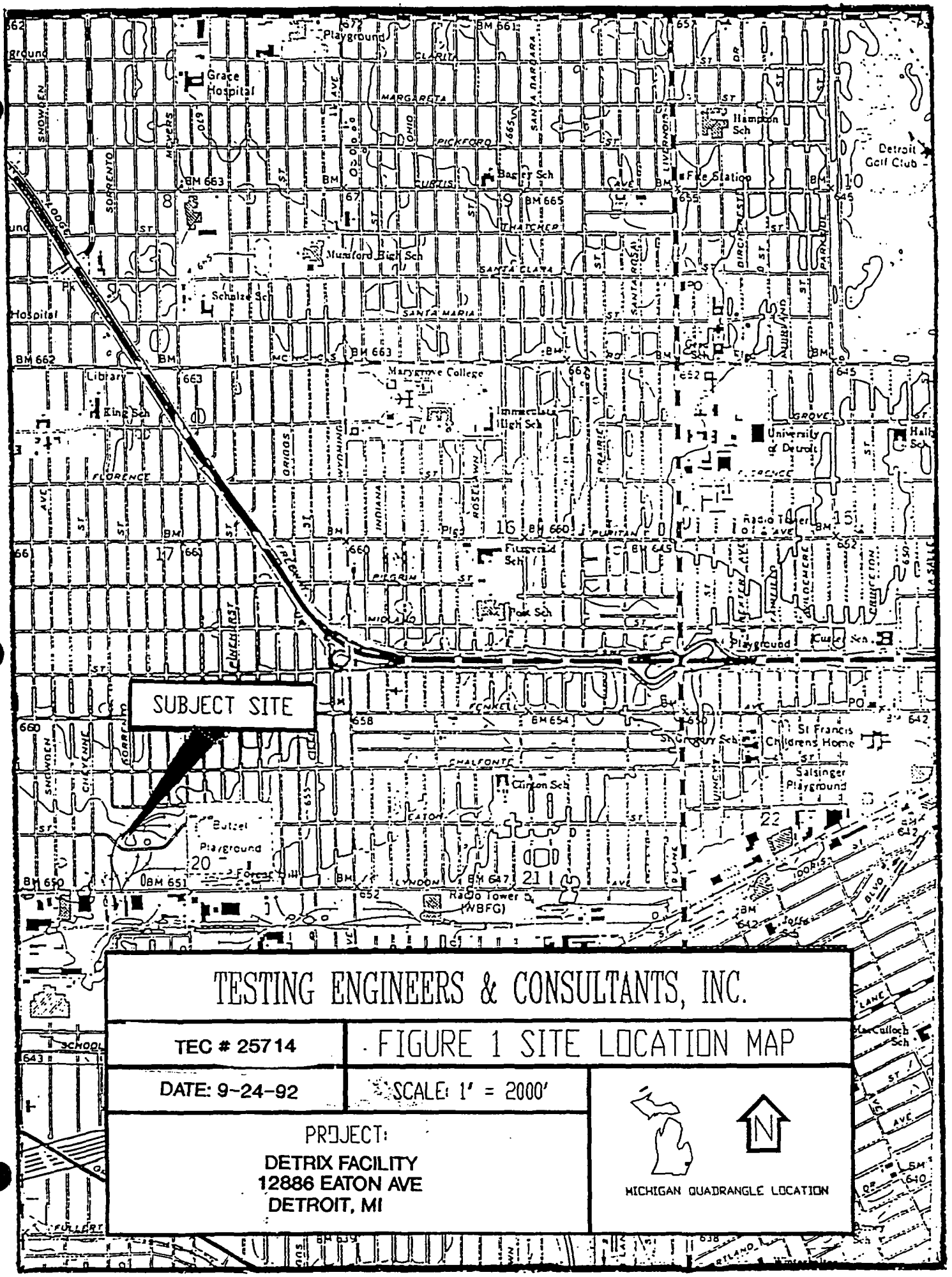
15.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Quality Assurance reports to Management are provided in the form of data validation narratives performed by the Quality Assurance Manager. Normally, these are included in the laboratory data evidence file described in Section 10.0, Data Reduction, Validation, and Reporting. These are routinely provided on a cas-by-case basis as described in Section 9.0, Internal Quality Control Checks, which includes Performance and Systems Audits. In the event of serous non-routine analytical or procedural difficulties, the Quality Assurance Manager, Laboratory Supervisor, and individual analysts are authorized to notify Management in writing.

* * * * * *

ATTACHMENT 1

USGS TOPOGRAPHY MAP



TESTING ENGINEERS & CONSULTANTS, INC.

TEC # 25714	FIGURE 1 SITE LOCATION MAP
DATE: 9-24-92	SCALE: 1" = 2000'

PROJECT:

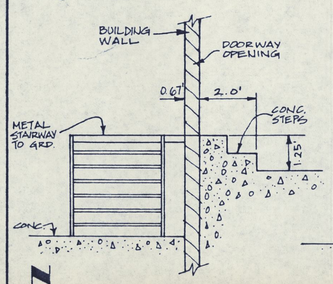
DETRIX FACILITY
12886 EATON AVE
DETROIT, MI

MICHIGAN QUADRANGLE LOCATION

ATTACHMENT 2

SITE LOCATION MAP

MULTI-COLOR 100 7-pt 46147



SECTION B-B
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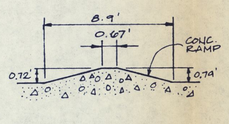

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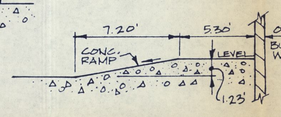

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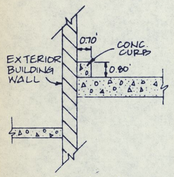

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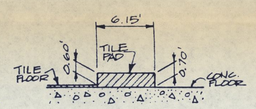

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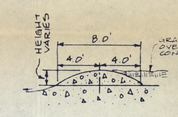

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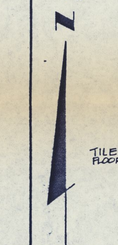


VICINITY MAP

SCALE: 1" = 200'

LEGAL DESCRIPTION

LOTS 16 AND 17 OF "HILL UNION BELT DEVELOPMENT SUBDIVISION", BEING THE N. 1/2 OF THE S. E. 1/4 OF THE N. W. 1/4 OF SEC. 20, T. 1 S., R. 11 E., CITY OF DETROIT, WAYNE COUNTY, MICHIGAN, ACCORDING TO THE PLAT THEREOF RECORDED IN THE OFFICE OF THE REGISTER OF DEEDS FOR WAYNE COUNTY, MICHIGAN IN LIBER 60 OF PLATS ON PAGE 62;

SUBJECT HOWEVER TO A PERMANENT EASEMENT HERETOFORE GRANTED TO THE PENNSYLVANIA, OHIO AND DETROIT RAILROAD OVER A STRIP OF LAND ON THE N'LY SIDE OF SAID LOTS FOR AN INDUSTRIAL RAILROAD TRACK AS PER DEED RECORDED IN L.2298 OF DEEDS ON P. 176-178 &OR, AND,

RESERVING TO THE SELLERS, THEIR HEIRS AND ASSIGNS, AN EASEMENT OVER AND ACROSS THE N.W.'LY AND N'LY REAR PORTIONS OF SAID LOTS 16 & 17 DESCRIBED AS ALL THAT PORTION OF SAID LOTS LYING N'LY AND N.W.'LY OF A LINE EXTENDING ACROSS SAID LOTS THAT 18 8½ FEET S'LY OF THE CENTER OF THE RAILROAD SIDING AS PRESENTLY INSTALLED AND IN USE CONNECTING WITH THE TRACK OF THE PENNSYLVANIA, OHIO AND DETROIT RAILROAD COMPANY; THE SAID EASEMENT TO COVER THE RIGHT TO USE THE SAME FOR PRIVATE RAILROAD SIDING AND RAILROAD SERVICES OVER SAME TO THE SAID PENNSYLVANIA, OHIO AND DETROIT RAILROAD, JOINTLY WITH ALL OTHER OWNERS OF LOTS 16, 19, 20, 21, 22, 23 AND 24 OF HILL UNION BELT DEVELOPMENT SUBDIVISION AFOREAID, SO THAT RAILROAD SERVICE MAY BE HAD BY ALL OTHER OWNERS ALONG THE LENGTH OF THE SIDING AS NOW INSTALLED AND IN USE.

NOTE: ABOVE DESCRIPTION IS FROM DEED TO DETROIT REX PRODUCTS COMPANY DATED DEC. 30, 1941, RECORDED JANUARY 8, 1942 IN LIBER 5902, DEEDS, PAGE 226.

CERTIFICATION

WE HEREBY CERTIFY THAT WE HAVE SURVEYED THE PROPERTY HEREON DELINEATED AND THAT THE DISTANCES SHOWN ARE TRUE AND CORRECT BY ACTUAL FIELD MEASUREMENTS AND THAT THERE ARE NO ENCROACHMENTS UNLESS OTHERWISE SHOWN.

DATE: July 11, 1985

WARNER, CANTRELL & PADMOS, INC.
BY: Donald A. Beaupied
DONALD A. BEAUPIED, REG. LAND SURVEYOR #11512

NOTE: ELEVATIONS SHOWN ARE BASED ON U.S.G.S. DATUM. TO OBTAIN CITY OF DETROIT DATUM SUBTRACT 480.27 FROM ELEVATIONS SHOWN. TO OBTAIN U.S.C. & G.S. DATUM DATUM SUBTRACT 0.51 FROM ELEVATIONS SHOWN.

NOTE: THE WAYNE COUNTY AIR POLLUTION CONTROL OFFICE (224-1650) REPORTS THROUGH THEIR METEOROLOGIST, DAVID DERENZO, THAT THE PREVAILING WINDS ARE OUT OF THE SOUTHWEST. THIS INFORMATION IS BASED ON NATIONAL WEATHER SERVICE RECORDS ON FILE IN THEIR OFFICE.

REVISIONS
ADDED NEW ELEVATIONS IN WAREHOUSE & REVISED SECT. C-C
ADDED SECT. F-F & G-G & ADDED CONTAINMENT AREA & ADDED # AIR MONITORING STATION 3-20-92

DATE: July 11, 1985
REVISIONS: JULY 26, 1985
ADD TEST BORING & WELL LOCATION INFO. APRIL 10, 1989
UPDATED FOR TRUCK WELL & PAVEMENT CONSTRUCTION APRIL 24, 1990
ADDED CROSS SECTIONS B-B, C-C, D-D & E-E & NEW TANK AREA WALLS 4-23-91
FOR MORE REVISIONS SEE BOTTOM LEFT

PLAN OF SURVEY OF LOTS 16 & 17 OF "HILL UNION BELT DEVELOPMENT SUBDIVISION" BEING THE N.½ OF THE S.E. 1/4 OF THE N.W. 1/4 OF SEC. 20, T. 1 S., R. 11 E., CITY OF DETROIT, WAYNE CO., MICH. (L. 60, P. 62)

SCALE: 1" = 20' DATUM: U.S.G.S. (SEE NOTE ABOVE)

WARNER, CANTRELL & PADMOS, INC.
CIVIL ENGINEERS AND LAND SURVEYORS
20788 ORCHARD LAKE RD.
313-478-9494 FARMINGTON HILLS, MI. 48336

JOB NO. 900408
PLAN FILE
N.B. 614
SHEET 1 OF 1

ATTACHMENT 3

PREVIOUS SAMPLE LOCATIONS

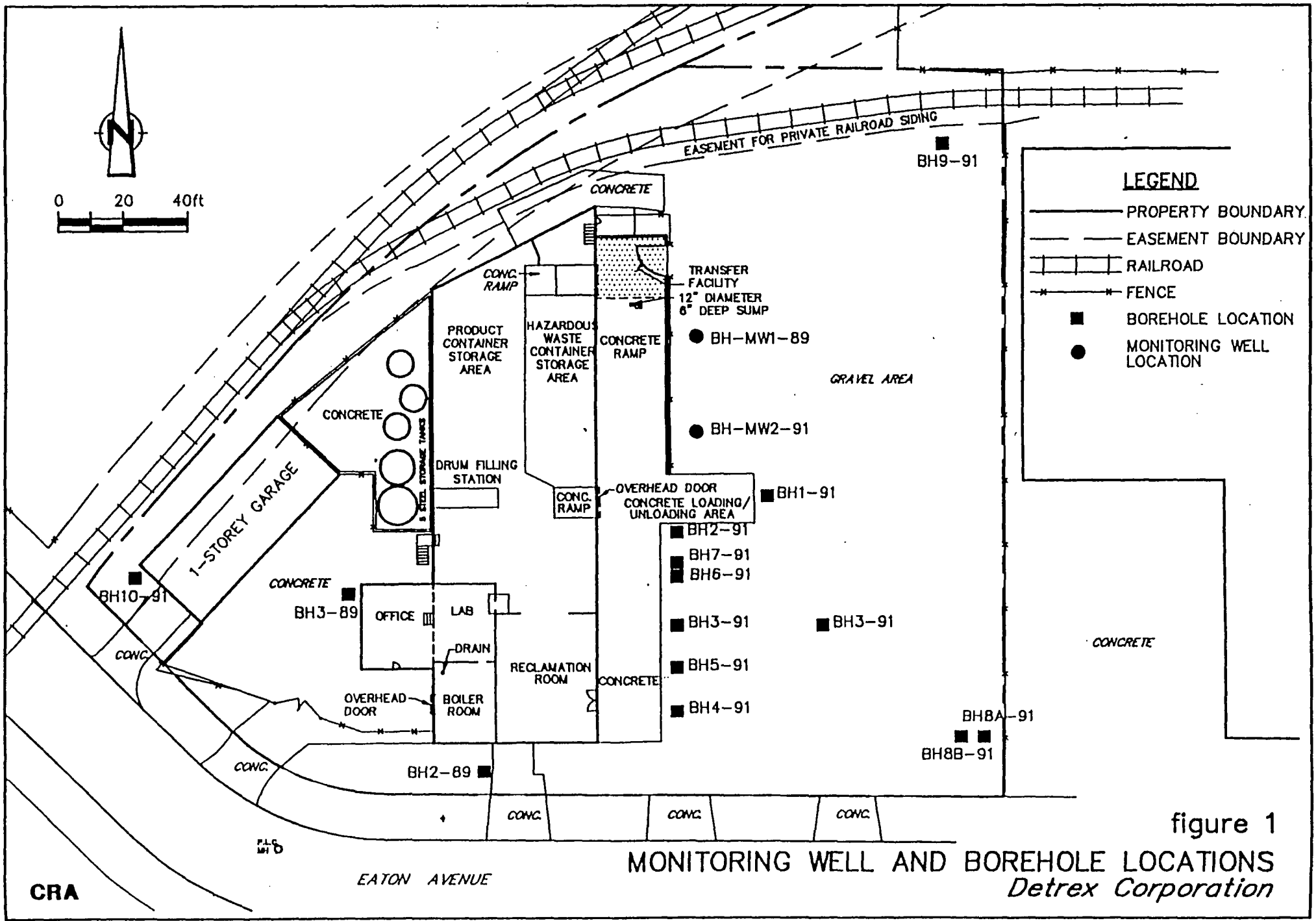


figure 1

MONITORING WELL AND BOREHOLE LOCATIONS

Detrex Corporation

CRA

2471-02/12/91-L-0 (P-22)

ATTACHMENT 4

BORING LOGS AND WELL LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-08)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH7-91

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 8, 1991

CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA

LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
2.5	FILL, medium grained, loose, brown, moist						
5.0		-5.0					
	CL-CLAY, some sand, fine grained, stiff, gray, moist	-6.0					
7.5	CL-CLAY, trace gravel, stiff, gray, moist		10" ø BOREHOLE				
10.0							
12.5	- same, very stiff		CUTTINGS				
15.0							
17.5							
20.0	- same, with trace sand			1SS		15	0
22.5							
25.0		-25.0		2SS		17	0
	END OF HOLE @ 25.0 FT. BGS						
27.5	NOTES: 1. Water not encountered.						
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-09)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH8A-91

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 14, 1991

CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA

LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE N VALUE	SAMPLE HNu (ppm)
	FILL, some sand, trace gravel, medium grained, loose, brown, moist						
2.5	Concrete	-2.0					
	SP-SAND, trace gravel, medium to coarse grained, loose, gray, wet	-4.0 (-1.0)	6" ø BOREHOLE; CUTTINGS	1SS		7	0
5.0							
7.5	CL-CLAY, trace gravel, trace sand, fine grained, firm, gray, wet	-7.5		2SS		3	0
10.0	END OF HOLE @ 10.0 FT. BGS	-10.0					
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-10)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH9-91

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 14, 1991

CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA

LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE N VALUE	SAMPLE HNU (ppm)
0	FILL, some sand, trace brick, trace gravel, medium grained, loose, black stained, moist						
2.5			10" ø BOREHOLE	1SS		15	6
5.0			CUTTINGS	2SS		4	6
	SC-SAND, some clay, medium grained, soft, brown, moist	-5.0					
		-6.0		3SS		7	0
7.5	CL-CLAY, trace silt, trace gravel, fine grained						
	CL-CLAY, some silt, trace sand, trace gravel, fine grained, stiff, brown, moist	-8.0		4SS		26	0
10.0	END OF HOLE @ 10.0 FT. BGS	-10.0					
	NOTES: 1. Water not encountered.						
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE

WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-11)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH10-91

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 14, 1991

CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA

LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
	FILL, some sand, medium grained, loose, tan, black stained, moist			1SS		16	0
2.5	FILL, some sand, trace gravel, medium grained, medium dense, brown, moist	-2.0	10" ø BOREHOLE	2SS		32	0
5.0	CL-CLAY, some silt, trace sand, fine grained, firm, gray brown mottled, moist	-4.0	CUTTINGS	3SS		15	0
7.5				4SS		26	0
	CL-CLAY, some silt, trace sand, trace gravel, fine grained, stiff, brown, moist	-8.0		5SS		33	0
10.0	END OF HOLE @ 10.0 FT. BGS	-10.0					
	NOTES: 1. Water not encountered.						
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-07)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH-MW2-91 (Page 1 of 4)

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 9, 1991

CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA / ROTARY

LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
2.5	FILL, medium grained, loose, brown, moist, black stained	-3.0					
	SC-SAND, some clay, fine grained, loose, moist	-4.0					
5.0	CL-CLAY, trace silt, trace gravel, fine grained, stiff, brown, moist						
7.5			4"ø CASING				
10.0			CEMENT/ BENTONITE GROUT				
12.5		-13.5					
15.0	CL-CLAY, trace gravel, fine grained, stiff, gray, moist		10"ø BOREHOLE				
17.5			CEMENT/ BENTONITE GROUT				
20.0	– same, trace sand						
22.5			2"ø WELL PIPE				
25.0							
27.5			3 7/8"ø MUD ROTARY				
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-07)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH-MW2-91

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 9, 1991
CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA / ROTARY
LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
35.0	CL-CLAY, trace gravel, fine grained, stiff, gray, moist						
37.5							
40.0							
42.5			2"ø WELL PIPE				
45.0							
47.5							
50.0			CEMENT/ BENTONITE GROUT				
52.5							
55.0			3 7/8"ø MUD ROTARY				
57.5							
60.0							
62.5							
65.0							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-07)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH-MW2-91

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 9, 1991
CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA / ROTARY
LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE N VALUE	SAMPLE HNu (ppm)
67.5							
70.0	– same, trace sand						
72.5							
75.0			3 7/8"ø MUD ROTARY				
77.5			CEMENT/ BENTONITE GROUT				
80.0							
82.5			2"ø WELL PIPE				
85.0							
87.5							
90.0	– same, soft			1SS		8	
92.5	– same, trace sand, stiff		BENTONITE PELLET SEAL	2SS		17	
95.0	– same, trace sand, firm			3SS		14	
	– same, trace sand, stiff						
97.5	SM-SAND, some gravel, some clay, some silt, medium to coarse grained, dense, gray, wet	-97.0	SAND PACK	4SS		49	
			WELL SCREEN	5SS		86	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ( ) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-07)

PROJECT NAME: BACKGROUND DATA COLLECTION PROGRAM
HOLE DESIGNATION: BH-MW2-91 (Page 4 of 4)

PROJECT NO.: 2471
DATE COMPLETED: OCTOBER 9, 1991

CLIENT: DETREX CORPORATION, EATON AVENUE
DRILLING METHOD: HSA / ROTARY

LOCATION: DETROIT, MI
CRA SUPERVISOR: MARK GLIHA

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
100.0	SP-SAND, trace gravel, trace silt, medium to coarse grained, dense, gray, wet	-100.0	3 7/8"ø MUD ROTARY; SAND PACK; WELL SCREEN; 2"ø WELL PIPE	6SS		65	
102.5	SW-SAND, fine grained, very dense, gray, wet	-102.0		7SS		114	
	- same, except fine to medium, dense.						
105.0	- same, except fine, very dense			8SS		87	
	SP-SAND, trace gravel, fine, medium to coarse grained, dense, gray, wet	-106.0		9SS		88	
107.5	END OF HOLE @ 107.5 FT. BGS	-107.5					
110.0							
112.5							
115.0							
117.5							
120.0							
122.5							
125.0							
127.5							
130.0							

SCREEN DETAILS:
Screened Interval:
97.5 to 107.5' BGS
Length -10.0'
Diameter -2.0"
Slot # 6
Material -Stainless Steel
Sand pack interval:
93.5 to 107.5' BGS
Material -Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE

REVISION ANALYSIS ( ) WATER FOUND ▽ STATIC WATER LEVEL ▼

ATTACHMENT 5

DATA QUALITY OBJECTIVE SUMMARY FORM
(FIELD LOG)

TABLE 4-2
DQO SUMMARY FORM

1. SITE

EPA REGION _____

NAME _____
LOCATION _____
NUMBER _____

PHASE _____
RI 1 RI 2 RI 3 ERA FS RD RA
(CIRCLE ONE)

2. MEDIA *(CIRCLE ONE)*	SOIL	GW	SW/SED	AIR	BIO	OTHER _____

3. USE *(CIRCLE ALL THAT APPLY)*	SITE CHARAC. (H&S)	RISK ASSESS.	EVAL. ALTS.	ENGG DESIGN	PRP DETER.	MONITORING REMEDIAL ACTION	OTHER _____

4. OBJECTIVE _____

5. SITE INFORMATION

AREA _____ DEPTH TO GROUND WATER _____
GROUND WATER USE _____
SOIL TYPES _____
SENSITIVE RECEPTORS _____

6. DATA TYPES *(CIRCLE APPROPRIATE DATA TYPES)*

A. ANALYTICAL DATA

pH	PESTICIDES	TOX
CONDUCTIVITY	PCB	TOC
VOA	METALS	BTX
ABN	CYANIDE	COD
TCLP	_____	_____

B. PHYSICAL DATA

PERMEABILITY	HYDRAULIC HEAD
POROSITY	PENETRATION TEST
GRAIN SIZE	HARDNESS
BULK DENSITY	_____
_____	_____

7. SAMPLING METHOD *(CIRCLE METHOD(S) TO BE USED)*

ENVIRONMENTAL	BIASED	GRAB	NON- INTRUSIVE	PHASED
SOURCE	GRID	COMPOSITE	INTRUSIVE	_____

8. ANALYTICAL LEVELS *(INDICATE LEVEL(S) AND EQUIPMENT & METHODS)*

LEVEL 1 FIELD SCREENING - EQUIPMENT _____
LEVEL 2 FIELD ANALYSIS - EQUIPMENT _____
LEVEL 3 NON-CLP LABORATORY - METHODS _____
LEVEL 4 CLP/RAS - METHODS _____
LEVEL 5 NON STANDARD _____

9. SAMPLING PROCEDURES

BACKGROUND - 2 PER EVENT OR _____
CRITICAL (LIST) _____
PROCEDURES _____

10. QUALITY CONTROL SAMPLES *(CONFIRM OR SET STANDARD)*

A. FIELD
COLLOCATED - 5% OR _____
REPLICATE - 5% OR _____
FIELD BLANK - 5% OR _____
TRIP BLANK - 1 PER DAY OR _____

B. LABORATORY
REAGENT BLANK - 1 PER ANALYSIS BATCH OR _____
REPLICATE - 1 PER ANALYSIS BATCH OR _____
MATRIX SPIKE - 1 PER ANALYSIS BATCH OR _____
OTHER _____

11. BUDGET REQUIREMENTS

BUDGET _____ SCHEDULE _____
STAFF _____

CONTRACTOR _____ PRIME CONTRACTOR _____
SITE MANAGER _____ DATE _____

FOR DETAILS SEE SAMPLING & ANALYSIS PLAN

CDM SF DQO 1.002

TABLE 4-2 (CONTINUED)

DQO SUMMARY FORM INSTRUCTIONS

1. SITE - Identify the site and phase of the work to be conducted
   - NAME - Site name or assignment as stated in the WA
   - LOCATION - City or Town County and State where site is located
   - NUMBER - Site number as stated in the WA
   - EPA REGION - EPA Region where the site is located
   - PHASE - Circle work phase for which DQO's are being developed: (number sequentially for each phase as appropriate):
     RI - Remedial
     ERA - Expedited Response Action
     FS - Feasibility Study
     RD - Remedial Design
     RA - Remedial Action

2. MEDIA - Circle the media being investigated; only one form will be completed for each media.
   - SOIL - Surface and subsurface soils
   - GW - Ground water
   - SW/SED - Surface water and sediment (a sediment sample will be taken if possible at each surface water sampling location)
   - AIR - Air quality and respirable dust monitoring
   - BIO - Biological monitoring, flora and fauna
   - OTHER - Indicate other "media" being investigated i.e. buildings, underground conduits, etc.

3. USE - Circle the intended use(s) of the data to be developed.
   - SITE CHARAC. (H&S) - Site characterization which includes a determination of the level(s) of health and safety protection required at the site
   - RISK ASSESS - Risk assessment, data to be used to perform the endangerment assessment or public health evaluation
   - EVAL. ALTS. - Evaluate alternatives, data will be used to evaluate or screen remedial/technological alternatives
   - ENG'G DESIGN - Data will be used to perform detailed engineering design of remedy
   - MONITORING - Data will be used to monitor during remedy implementation or establish baseline conditions for long term monitoring after site remediation
   - PRP DETERMINATION - Data will be used to confirm/fingerprint contaminants to specific potentially responsible parties for possible furture or pending enforcement actions
   - OTHER - Indicate other specific data uses

4. OBJECTIVE - Provide a concise, specific statement that answers the question "Why am I taking these samples?"

5. SITE INFORMATION - Provide the site information necessary to gain an overview of the site and the relative complexity and extent of data requirements
   - AREA - Indicate the area of the site in acres and an indication of the configuration (length and width)
   - DEPTH TO GROUND WATER - Indicate the depth to ground water from the ground surface, to the extent known identify seasonal fluctuation and the depth and thickness of multiple aquifers
   - GROUND WATER USE - Identify both potable and non-potable ground water use(s) by aquifer, if appropriate, and the point(s) of extraction relative to the site
   - SOIL TYPES - Identify, to the extent known, the site soil strata and relative depths below ground surface
   - SENSITIVE RECEPTORS - Identify population and environmental concerns, relative to the site, which could be impacted by contaminant migration

6. DATA TYPES - Circle the appropriate analytical and physical data required to to determine the type, degree, extent and migration characteristics of the contaminants and the required site characteristics. The selection of data types required must be developed by the site manager with the data users as described in section 3.2

7. SAMPLING METHODS - Circle the appropriate sampling method(s) to be used in obtaining the required data in accordance with the objectives above
   - ENVIRONMENTAL - Refers to media sampling of air, water, soils and the biological environment to determine the extent of contamination
   - SOURCE - Refers to the sampling of the actual contamination source(s)
   - BIASED - Refers to sampling which focuses on a specific site area, characteristic or problem factor based upon site knowledge and/or modeling
   - GRID - Refers to unbiased sampling which provides a representative estimate of contamination problem over the entire site
   - GRAB - Refers to discrete samples which are representative of a specific location at a specific point in time.
   - COMPOSITE - The mixture of a number of grab samples to represent the average properties of the parameters of concern over athe extent of the area sampled
   - NON-INTRUSIVE - Refers to obtaining data using methods and equipment that do not require the physical extraction of sample from the media being sampled
   - INSTRUSIVE - Refers to physically extracting samples from the media being sampled
   - PHASED- Refers to performing discrete time-phased sampling events and using the information obtained in the previous event to refine the subsequent sampling event

8. ANALYTICAL LEVELS - The analytical levels are described in Section 9 of the Guidance
   - LEVEL 1 FIELD SCREENING - EQUIPMENT - Identify the field monitoring equipment to be used and the manufacturer's specified detection limits when known
   - LEVEL 2 FIELD ANALYSIS - EQUIPMENT - Identify the field analysis to be used and the historically achievable instrument detection limits
   - LEVEL 3 NON-CLP LABORATORY - METHODS -Identify the laboratory method(s) to be used and the historically achievable precision and accuracy when available
   - LEVEL 4 CLP/RAS - METHODS - Identify the CLP laboratory method(s) to be used and the historically achievable precision and accuracy
   - LEVEL 5 NON-STANDARD - Specify requirement for non-standard analysis, analytical procedures to be used and required precision and accuracy

9. SAMPLING PROCEDURES - The procedures to be used in obtaining the required samples are to be defined, a description of the critical samples is to be provided and the requirement of obtaining a minimum of two background samples per sampling event is to be confirmed or the deviation from this minimum standard defined

10. QUALITY CONTROL SAMPLES - The identified minimum standards for the field and laboratory quality control samples must be confirmed or revised on a site specific basis

11. BUDGET REQUIREMENTS - Based upon the analysis summarized above the critical resource requirements shall be defined
   - BUDGET - The estimated cost of the sampling and analysis shall be presented in dollars
   - SCHEDULE - The total time required to perform the sampling and the estimated time, as appropriate to perform the analysis shall be presented by calendar days, by phase
   - STAFF - The key staff disciplines required to perform the sampling shall be identified

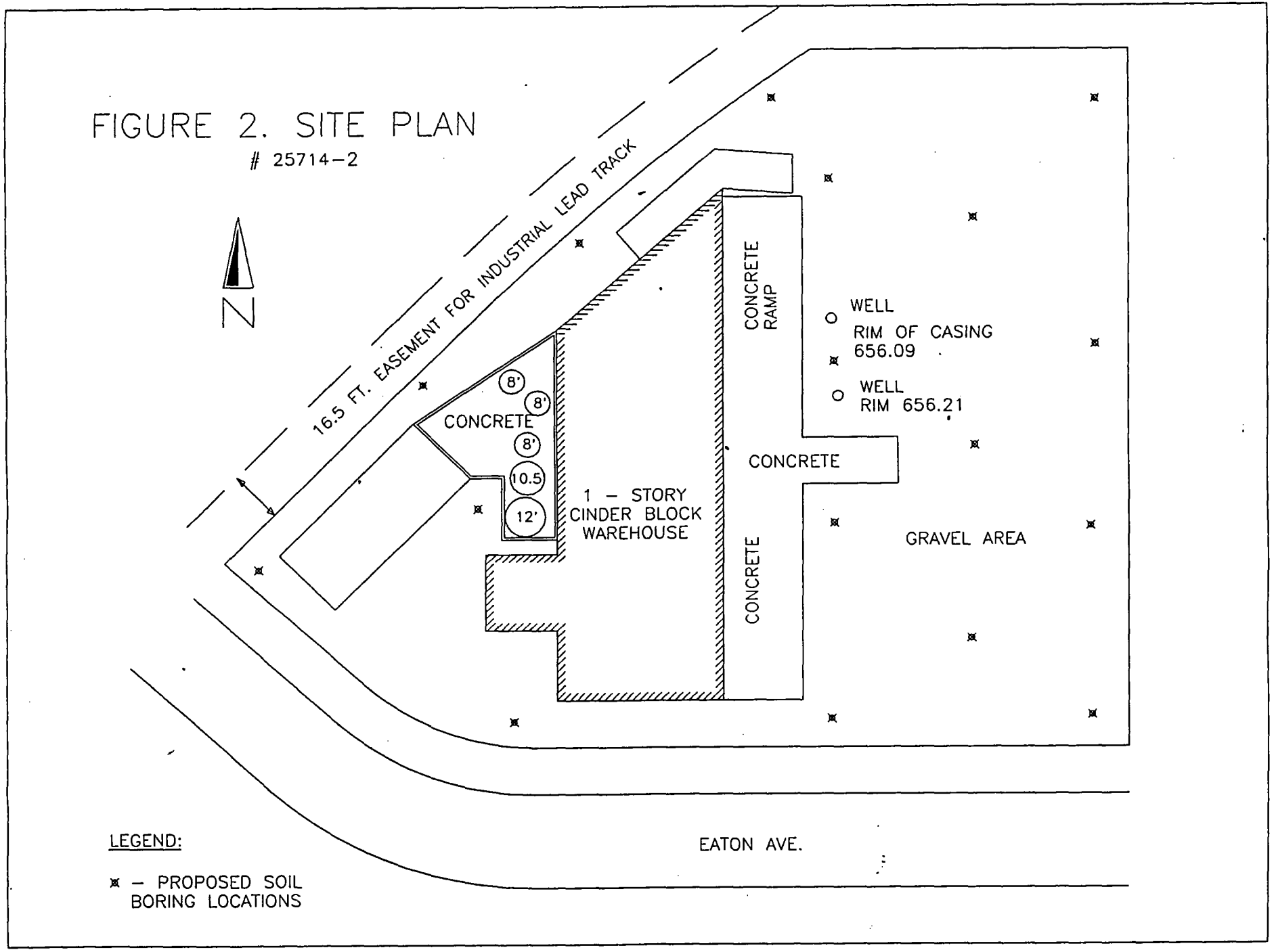
The form shall identify the contractor directly responsible for the work the prime contractor and must be signed and dated by the site manager.

ATTACHMENT 6

PROPOSED SAMPLE LOCATION DIAGRAM

FIGURE 2. SITE PLAN

25714-2



ATTACHMENT 7

BORING LOG EXAMPLE

TESTING ENGINEERS & CONSULTANTS, INC.

P.O. BOX 249 • 1333 Rochester Road • Troy, Michigan 48099
313 — 588-6200

MEMBER

soil borings . *soil evaluation* *foundation investigation* *instrumentation*

BORING NO._____ JOB NO._____ PROJECT_____

Ground Surface (Elev.)_____

Datum_____

CLIENT_____ Location_____

Started:_____ Completed_____

Driller:_____

DEPTH IN FEET	SAMPLE TYPE	SAMPLE "N"	STRATA CHANGE	SOIL CLASSIFICATION	PID ppm	WELL DATA
5						
10						
15						
20						
25						

"N" - Standard Penetration Resistance
S.S. - 2" O.D. Split Spoon Sample
L.S. - Sectional Liner Sample
S.T. - Shelby Tube Sample
B.S. - Bottle Sample

PID - Photoionization Detector
ppm - Parts Per Million
ND - Not Detected

WATER ENCOUNTERED AT COMPLETION

Boring No._____/ln

ATTACHMENT 8

CHAIN-OF-CUSTODY

DATE: _____

Testing Engineers & Consultants, Inc.

P.O. Box 249 • 1333 Rochester Road • Troy, MI 48099
313-588-6200 or Dial 313-T-E-S-T-I-N-G

TEC #	PROJECT NAME	PRESERVATIVE						COMMENTS
SAMPLERS:								
SAMPLE #	IDENTIFICATION							

Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date/Time	Received for Laboratory by: *(Signature)*	Date/Time	Remarks	

Testing Engineers and Consultants, Inc.

REQUEST FOR ANALYTICAL SERVICES

Chain-of-Custody #:

Job Number:

Client:

Log-In Date: _____

Assignment Date: _____

Analysis Due Date: _____

Client Due Date: _____

Assigned to: _____ Sample Description/Location: _____

	ANALYTES:										
SAMPLE NUMBER	SAMPLE AMOUNT	(UNITS)		(UNITS)		(UNITS)		(UNITS)		(UNITS)	
Analyzed by:											
Comments:											

HEALTH AND SAFETY PLAN/ CORRECTIVE ACTION PLAN

12886 EATON AVENUE

DETROIT, MICHIGAN

Testing Engineers & Consultants, Inc.
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Troy, Michigan 48083-6015
(313) 588-6200 or Dial (313) T-E-S-T-I-N-G

08 October 1992

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HEALTH AND SAFETY PLAN/CORRECTIVE ACTION PLAN

1.0 INTRODUCTION

1.1 Facility Description

This Health and Safety Plan (HASP) pertains specifically to the Detrex Corporation's Eaton Avenue facility, located at 12886 Eaton Avenue, in the City of Detroit, Michigan. The subject facility houses the Solvents and Environmental Services Division, which includes the following services: solvent reclamation; containerization; and storage of reclaimed products.

The site is bordered to the north and west by a railroad easement, to the south by Eaton Avenue, and to the east by the Detroit Non-Ferrous Foundry, Inc.

Resources available on-site include potable water supply, electricity, telephone, restrooms, eye wash station/first aid equipment, and site specific air monitoring stations. The yard surrounding the facility is a combination of asphalt driveway and parking on the west side of the building, and gravel on the north and east sides of the facility.

2.0 FIELD INVESTIGATION PERSONNEL

2.1 Training

All personnel assigned to the site will be trained in the use of protective equipment; emergency response equipment; site-specific health and safety procedures; and site hazards consistent with 29 CFR, Part 1910, Subpart D (OSHA 40-hour trained) that may be present. Training will be conducted prior to starting work on-site and documented in site records.

.....continued

2.1 Training (Cont'd)

Only authorized visitors who have completed the OSHA 40-hour Site Safety Training will be allowed to access the site. All Testing Engineers & Consultants, Inc. (TEC) personnel, as well as any authorized visitors, will be provided a copy of the site-specific Health and Safety Plan to read and sign. In addition, all personnel will be given a brief safety orientation by the Site Manager or Health and Safety Officer.

2.2 Medical Surveillance

All personnel assigned to work at the site will be in good general health and able to wear necessary protective equipment. Subcontractors will provide certification as to the physical fitness of their personnel to conduct the work under this Health and Safety Plan. During project planning, a physician will be contacted, if appropriate, and informed of planned activity (including specific hazards) in order to determine if special medical surveillance is warranted.

2.3 Air Monitoring

Air monitoring will be performed to identify and quantify airborne contaminants in order to determine the necessary level of Organic Vapor Analyzer, will be used to monitor the air any time the potential for hazardous vapors may occur. The HNU has an analytical worker protection. A direct reading instrument, such as an HNU range of 0.2 to 2,000 parts per million (ppm). The instrument will be calibrated daily per manufacturer's directions. The frequency of air

.....continued

2.3 Air Monitoring (Cont'd)

monitoring will be determined by the field supervisor. Table 1 indicates the chemicals known to be present on-site and their industrial hygiene exposure limits.

The appropriate level of protection will be adopted to suit the level of Total Volatile Organics detected. The following ambient air contaminant levels will govern the usage of personnel protective equipment (PPE).

TABLE 1

	Site	TWA	IDLH
1,2 DCE (540-59-0)	145 ppb	200 ppm	4,000 ppm
1,1,1 TCE (71-55-6)	484 ppb	350 ppm	1,000 ppm
TCE (79-01-6)	812 ppb	25-50 ppm	1,000 ppm
1,1,2 TCA (79-00-5)	12.8 ppb	10 ppm	1,000 ppm
PCE (127-18-4)	527 ppb	25 ppm	500 ppm

TWA - Time Weighted Average
IDLH - Immediately Dangerous to Life and Health
ppb - Parts per billion
ppm - Parts per million

HNU Reading Sustained for (≥ 5 minutes)	Level of Protection (See Section 2.5)
< 5 ppm	C or D
> 5 ppm and < 25 ppm	B
≥ 25 ppm	A

.....continued

2.4 Personal Hygiene

All safety rules will be observed. No eating, chewing, drinking, or smoking will be allowed near the work site. Each employee will wash their hands thoroughly before lunch and breaks. Facilities will be provided off the work site for lunch and breaks. This is to include no eating, etc., in or on the work vehicles at the site.

2.5 Protective Equipment

The areas of primary concern regarding potential personnel exposure to hazardous chemicals are entry via inhalation and skin absorption, including the eyes. The degree of protection will be commensurate with the potential for exposure. However, judgements will be made by the field supervisor to determine the potential benefit of protective equipment versus the risk of added health and safety hazards; i.e. heat stress, loss of dexterity, tripping hazards, etc. Professional judgement will be used to balance adequate employee protection versus increased physical hazards. The Site Manager or Health and Safety Officer will make this determination based on information in the Site Health and Safety Plan and their best professional judgement.

The following levels of protection are required for field work on the site. These have been patterned after those established by the U.S. Environmental Protection Agency (EPA) and Army Corps of Engineers. The specific level of protection required for different field tasks are listed below:

.....continued

2.5 Protective Equipment (Cont'd)

LEVEL D: Minimum Level of Protection

Coveralls; safety boots/shoes; safety glasses or chemical splash goggles; hard hat.

Optional Equipment: Gloves; escape mask; face shield.

LEVEL C: Skin and Eye Protection

Full face air-purifying respirator; chemical resistant clothing; inner and outer chemical resistant gloves; chemical resistant safety boots/shoes; hard hat; two-way radio communication.

Optional Equipment: Coveralls; disposable boot covers; face shield; escape mask; long cotton underwear.

LEVEL B: Increased Skin Protection Plus Respiratory Protection

Pressure-demand full-face SCBA or pressure-demand supplied-air respirator with escape SCBA; chemical resistant clothing; inner and outer chemical resistant gloves; chemical resistant safety boots/shoes; hard hat; two-way radio communications.

Optional Equipment: Coveralls; disposable boot covers; face shield; long cotton underwear.

LEVEL A: Highest Level of Respiratory, Skin, and Eye Protection

Pressure-demand full-face SCBA or pressure-demand supplied-air respirator with escape SCBA, fully-encapsulating; chemical resistant suit; inner chemical resistant gloves; chemical-resistant safety boots/shoes; two-way radio communications.

Optional Equipment: Cooling unit; coveralls; long cotton underwear; hard hat; disposable gloves and boot covers.

The level of protection for specific tasks and personnel are listed below:

.....continued

2.5 Protective Equipment (Cont'd)

Task	Personnel	Health and Safety Level of Protection
Drilling test borings	Drillers Geologist	D or C
Collecting and handling soil samples	Drillers Geologist	D or C
Decontamination of equipment	Drillers Geologist	D

Based on our knowledge of the site history and current level of activity, we expect to conduct the proposed field investigations using Level D or C protection. Level B protection will be activated if and when there is a potential threat for exposure from unknown contaminants during drilling or sampling. If the situation arises where Level A protection is deemed necessary, the area of concern will be evacuated and the situation assessed so that appropriate response measures can be taken.

2.6 Site Operations

Prior to initiation of site activities, all appropriate work permits, utility clearances, etc., will be completed and complied with in conjunction with plant personnel.

2.7 Activity Reports

A log book will be kept to document all site activities including air monitoring results, site safety concerns, protective equipment used, and a site entry and exit sign-in log.

*Weather-related Safety Problems - Since activities to be performed on-site will require the use of drill rigs, operations will be ceased in any storm events that present the possibility of electrical discharge.

.....continued

2.8 Emergency Response

The buddy system will be utilized at all times when site activities are being conducted. If an accident occurs, the affected person will be taken from the area for appropriate first aid. For inhalation exposures, personnel will be removed to fresh air, and medical aid will be administered if any symptoms appear (dizziness, etc.). If skin or eyes are affected, they will be washed with copious amounts of water, and medical attention will be sought. The appropriate emergency equipment, such as fire extinguishers, first aid kits, etc., will be included in site equipment and available to field personnel.

Health and safety will be stressed to everyone conducting site related activities, and the Health and Safety Officer will have the responsibility of insuring that the Site Safety Plan is adhered to at all times. Field personnel also have the responsibility to be safety conscious and should report any unsafe conditions or acts that have the potential to affect site activities. If, at any time, personnel feel that a particular task is unsafe and precautions have not been adequately covered in the Site Safety Plan, that fact should be brought to the attention of the Site Manager or Site Safety Officer immediately.

The nearest hospital with emergency services is Grace Hospital, located approximately 2.5 miles north of the facility. The emergency phone number is (313) 966-3045. From the facility, the most direct route is Schaeffer Highway north to West Outer Drive east. The hospital is located approximately five blocks east of West Outer Drive, on Margareta Street.

.....continued

3.0 COMMUNITY HEALTH AND SAFETY

This investigation will be conducted within the site boundaries and does not present any health or safety risks for the community at large. Regular briefing of local health officials on investigation activities will be conducted to assess community health and safety risks.

Health and safety risks for the community will be reevaluated under the Corrective Measures Study to determine the effects of proposed remedial actions on community health and safety.

* * * * * *

PRELIMINARY ECOLOGICAL ASSESSMENT

DETREX CORPORATION
MID 091 605 972

TASK I - ATTACHMENT IV

Testing Engineers & Consultants, Inc.
P.O. Box 249
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08 October 1992

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PRELIMINARY ECOLOGICAL ASSESSMENT

TASK I - ATTACHMENT IV

1.0 INTRODUCTION

The Preliminary Ecological Assessment is being written as part of the Federal Hazardous Waste Permit Conditions (Detrex Corporation, Solvents and Environmental Services Division, Detroit, Michigan, MID 091 605 972). Specifically, this assessment addresses the permit conditions outlined in Task I of Attachment IV. The following sections include the information as required by the task.

2.0 DESCRIPTION OF THE BIOTA IN SURFACE WATER BODIES ON, ADJACENT TO, OR AFFECTED BY THE FACILITY

The Detrex facility (Facility) is located in a predominantly industrial area that is heavily developed, with little land area being unused. Surface water bodies, such as lakes, ponds, rivers or creeks, are not present in the area. The closest body of water is the Rouge River, which is located approximately 2.5 miles southwest at its nearest point. Given this information, it is not expected that biota related to surface water are present on, adjacent to, or will be affected by the facility.

3.0 DESCRIPTION OF THE ECOLOGY OVERLYING AND ADJACENT TO THE FACILITY

On the Facility property, the flora consists primarily of sparsely distributed, pioneer-type plant species. Those plants identified include, but are not limited to, cottonwood, box elder,

.....continued

3.0 DESCRIPTION OF THE ECOLOGY OVERLYING AND ADJACENT TO THE FACILITY (Cont'd)

Chinese elm, Virginia creeper, grasses, milkweed, goldenrod, chicory, and morning glory. The plant life on the facility does not support an animal habitat.

Adjacent to the Facility on all sides lie industrial properties, all of which exhibit similar flora to the Facility.

4.0 DESCRIPTION OF ANY ENDANGERED OR THREATENED SPECIES NEAR THE FACILITY

The Michigan Department of Natural Resources (MDNR) was contacted regarding the presence of endangered or threatened species at or near the Facility. According the the MDNR, there are no known species that are endangered or threatened.

5.0 IDENTIFICATION OF FACILITY-SPECIFIC CONDITIONS PERTINENT TO THE EVALUATION OF FATE AND TRANSPORT PROCESSES OCCURRING AT THE SITE

The portion of the Facility consumed by building, loading, and active areas are all covered by concrete paving (primarily the west half of the property). In addition, all of these areas are curbed to contain a spill should one occur. The topography of these areas is also primarily flat, and it is not expected that erosion of concrete or soils will occur due to precipitation and/or a spill. See Attachment 1 for a topographic survey of the site.

The remainder of the property, outside the areas described above, is sloped slightly (less than .019 feet/foot gradient) to allow for some drainage. No appreciable erosion of soil is expected.

.....continued

6.0 IDENTIFICATION OF POTENTIAL AND PROBABLE EXPOSURE POINTS FOR ECOLOGICAL RECEPTORS

The storage and receiving areas are located within an enclosed building and/or curbed to provide adequate secondary containment. The only ecological receptor which could be impacted should these secondary systems fail is the gravel area (identified as Section A-A of the Topographic Map) on the eastern portion of the site. However, should proper attention be paid to site security, routine inspection and maintenance, proper containment of waste materials and strict adherence to all applicable State and Federal regulations, the potential for ecological impact is negligible.

7.0 IDENTIFICATION OF KNOWN OR OBSERVED EFFECTS OF FACILITY CONTAMINANTS TO BIOTA, SUCH AS FISH KILLS OR OTHER OBVIOUS IMPACTS

No known affects or impacts to biota in the area have been identified.

8.0 INITIAL TOXICITY ASSESSMENT OF FACILITY CONTAMINANTS

Given the information presented above (i.e., lack of biota, limited receptive areas, and fauna, etc.), this Initial Toxicity Assessment is directed toward human exposure.

The Facility processes primarily methylene chloride, perchloroethylene, trichloroethylene, 1,1,1-trichloroethane, and trichlorotrifluoroethane. Each of these compounds is an industrial solvent, is colorless, and easily evaporates into the air.

.....continued

8.0 INITIAL TOXICITY ASSESSMENT OF FACILITY CONTAMINANTS (Cont'd)

Based on the physical characteristics of the compounds, inhalation is the primary route of exposure. Minimal concern is directed toward exposures to the skin. Normal practices require the use of proper personal protective equipment during handling. In addition, exposure is limited due to the evaporation rate.

Exposure through inhalation of these compounds can cause detrimental effects to the central nervous system. Symptoms from short term exposure include dizziness, loss of balance and coordination, sluggishness, light-headedness, headaches, and nausea. Acute exposure to high doses include eye, nose, and throat irritation. These symptoms represent warning signs that personnel should take notice of to avoid long-term exposure and subsequent long-term health effects.

In addition to the concerns listed above, the compounds methylene chloride, tetrachloroethylene, and trichloroethylene are classified as carcinogens through inhalation. Methylene chloride has been found to produce lung and liver damage in laboratory animals. Trichloroethylene affects the lungs, and tetrachloroethylene affects the liver and can lead to leukemia.

9.0 EVALUATION OF THE NEED FOR MORE DATA AND FURTHER INVESTIGATIONS TO COMPLETE THE ECOLOGICAL ASSESSMENT

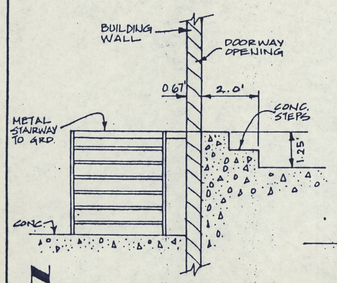
Based on the information collected and presented above, an additional investigation described as Task 2 (see attached) into the ecological conditions does not appear necessary.

* * * * * *

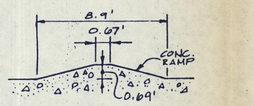
ATTACHMENT 1

SITE TOPOGRAPHY MAP

MULTI-COLOR SBC 2-66 8616P



SECTION B-B
NTS



SECTION C-C
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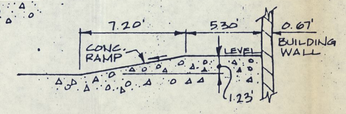

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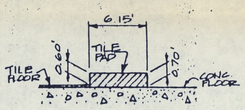

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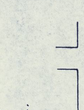

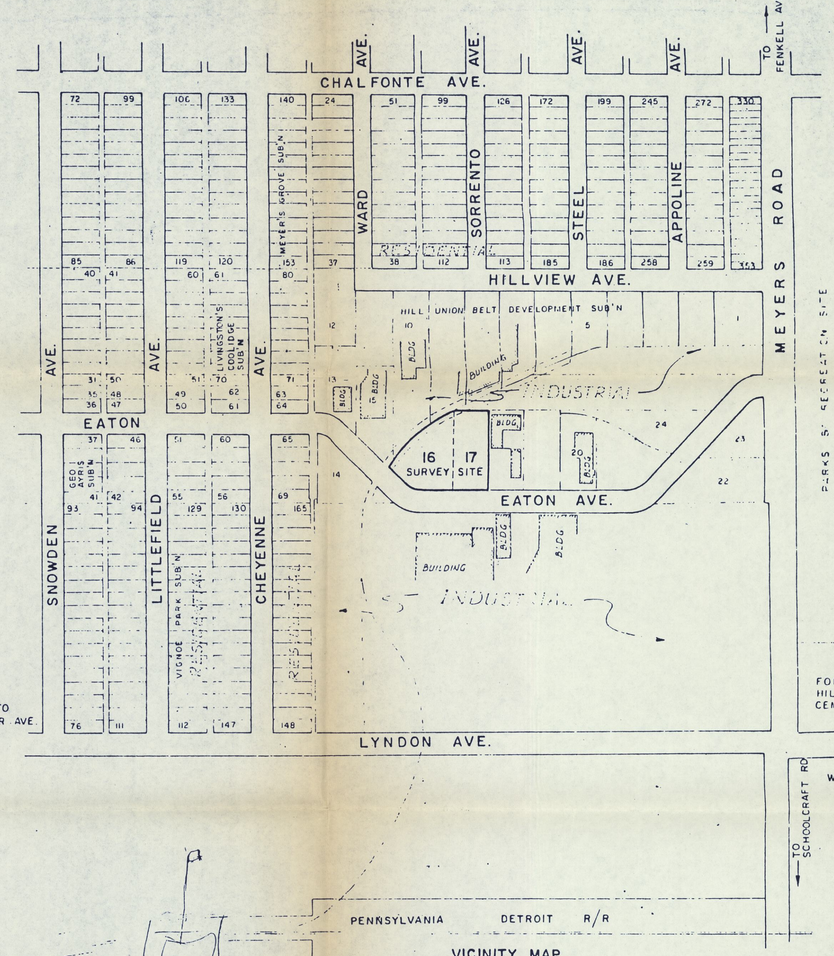

VICINITY MAP

SCALE: 1" = 200'

LEGAL DESCRIPTION

LOTS 16 AND 17 OF "HILL UNION BELT DEVELOPMENT SUBDIVISION", BEING THE N. 1/2 OF THE S. E. 1/4 OF THE N. W. 1/4 OF SEC. 20, T. 1 S., R. 11 E., CITY OF DETROIT, WAYNE COUNTY, MICHIGAN, ACCORDING TO THE PLAT THEREOF RECORDED IN THE OFFICE OF THE REGISTER OF DEEDS FOR WAYNE COUNTY, MICHIGAN IN LIBER 60 OF PLATS ON PAGE 62;

SUBJECT HOWEVER TO A PERMANENT EASEMENT HERETOFORE GRANTED TO THE PENNSYLVANIA, OHIO AND DETROIT RAILROAD OVER A STRIP OF LAND ON THE N'LY SIDE OF SAID LOTS FOR AN INDUSTRIAL RAILROAD TRACK AS PER DEED RECORDED IN L.2298 OF DEEDS ON P. 176-178 INCL, AND,

RESERVING TO THE SELLERS, THEIR HEIRS AND ASSIGNS, AN EASEMENT OVER AND ACROSS THE N.W.'LY AND N'LY REAR PORTIONS OF SAID LOTS 16 & 17 DESCRIBED AS "ALL THAT PORTION OF SAID LOTS LYING N'LY AND N.W.'LY OF A LINE EXTENDING ACROSS SAID LOTS THAT IS 84 FEET S'LY OF THE CENTER OF THE RAILROAD SIDING AS PRESENTLY INSTALLED AND IN USE, CONNECTING WITH THE TRACK OF THE PENNSYLVANIA, OHIO AND DETROIT RAILROAD COMPANY; THE SAID EASEMENT TO COVER THE RIGHT TO USE THE SAME FOR PRIVATE RAILROAD SIDING AND RAILROAD SERVICE OVER SAME TO THE SAID PENNSYLVANIA, OHIO AND DETROIT RAILROAD, JOINTLY WITH ALL OTHER OWNERS OF LOTS 18, 19, 20, 21, 22, 23 AND 24 OF HILL UNION BELT DEVELOPMENT SUBDIVISION AFOREBAID, SO THAT RAILROAD SERVICE MAY BE HAD BY ALL OTHER OWNERS ALONG THE LENGTH OF THE SIDING AS NOW INSTALLED AND IN USE.

NOTE: ABOVE DESCRIPTION IS FROM DEED TO DETROIT REX PRODUCTS COMPANY DATED DEC. 30, 1941, RECORDED JANUARY 8, 1942 IN LIBER 5902, DEEDS, PAGE 226.

CERTIFICATION

WE HEREBY CERTIFY THAT WE HAVE SURVEYED THE PROPERTY HEREON, DELINEATED AND THAT THE DISTANCES SHOWN ARE TRUE AND CORRECT BY ACTUAL FIELD MEASUREMENTS AND THAT THERE ARE NO ENCROACHMENTS UNLESS OTHERWISE SHOWN.

DATE: July 11, 1985

WARNER, CANTRELL & PADMOS, INC.

BY: Donald A. Beaupied

DONALD A. BEAUPIED, REG. LAND SURVEYOR #11512

ATTACHMENT B-2

LEGEND

GROUND ELEVATION CONTOUR

DIRECTION OF SURFACE WATER RUNOFF FLOW

NOTE:
ELEVATIONS SHOWN ARE BASED ON U.S.G.S. DATUM. TO OBTAIN CITY OF DETROIT DATUM SUBTRACT 480.27 FROM ELEVATIONS SHOWN. TO OBTAIN U.S.C. & G.S. DATUM DATUM SUBTRACT 0.51 FROM ELEVATIONS SHOWN.

NOTE: THE WAYNE COUNTY AIR POLLUTION CONTROL OFFICE (224-4650) REPORTS THROUGH THEIR METEOROLOGIST, DAVID DERENZO, THAT THE PREVAILING WINDS ARE OUT OF THE SOUTHWEST. THIS INFORMATION IS BASED ON NATIONAL WEATHER SERVICE RECORDS ON FILE IN THEIR OFFICE.

DATE: July 11, 1985

REVISIONS: JULY 26, 1985
ADD TEST BORING & WELL LOCATION INFO. APRIL 10, 1989
UPDATED FOR TRUCK WELL & PAVEMENT CONSTRUCTION APRIL 24, 1990
ADDED CROSS SECTIONS B-B, C-C, D-D & E-E & NEW TALLY AREA WALLS 4-23-91

PLAN OF SURVEY OF LOTS 16 & 17 OF "HILL UNION BELT DEVELOPMENT SUBDIVISION" BEING THE N.½ OF THE S.E. 1/4 OF THE N.W. 1/4 OF SEC. 20, T. 1S., R. 11 E., CITY OF DETROIT, WAYNE CO., MICH. (L. 60, P. 62)

SCALE: 1" = 20' DATUM: U.S.G.S. (SEE NOTE ABOVE)

WARNER, CANTRELL & PADMOS, INC.
CIVIL ENGINEERS AND LAND SURVEYORS
20788 ORCHARD LAKE RD.
313-478-9494 FARMINGTON HILLS, MI. 48336

JOB NO.

PLAN FILE

N.B. 614

SHEET 1 OF 1

CRA PROJECT No. 2471 DWG No. 02 FILE: S